

# THE IRON AGE

New York, May 29, 1919

ESTABLISHED 1855

VOL. 103: No. 22

## Institute Rejoices Over War Victory

### Over Thirteen Hundred Attend May Meeting

Feeling of Cheerfulness as to Business Conditions Prevails, But Seriousness of Problems of Peace Not Ignored—Record of Steel Manufacturers in the World Struggle Reviewed—Enthusiastic Greeting to Messrs. Schwab, Brookings, Butler, Knecht and Others

WHEN the American Iron and Steel Institute met in New York in May, 1918, the Great War was at its height and the result was in doubt. Among those who then addressed the meeting were Charles M. Schwab who, in response to the summons of the President of the United States, was giving his whole time and strength to his country; J. Leonard Replogle who, as director of steel supplies, was filling a highly important position, and Maj. Gen. Glenn, who was on his way to France to take part in the great struggle. Men's minds were in the most serious mood. This fact was reflected in Judge Gary's address and throughout the meeting.

When the meeting of the institute was held in New York, last Friday, there was a record-breaking attendance, the number being 1300 as compared with the previous record of several years ago, 1125. The prevailing feeling was one of rejoicing that the war for democracy had been won and of keen satisfaction that the steel industry had played such a highly important part. Of course there was not lacking a full appreciation of the seriousness of the problems of peace, and there was no attempt to disguise the fact that business conditions at present are not satisfactory, but the prevailing sentiment was one of cheerfulness as to business and even of confidence

that the return of prosperity will not long be delayed.

The large assembly room at the Hotel Pennsylvania was crowded, with many standing, while Judge Gary delivered the opening address, Friday morning. It was listened to most attentively, as were the papers which followed, and it was noteworthy that the attendance throughout the reading of the technical papers was unusually large. The papers were uniformly of a high order and devoted largely to telling in the most impressive way the story of what the steel industry did to help in winning the war. They were especially noteworthy on account of their elaborate illustration—several of the speakers using the stereopticon and moving pictures most effectively. Judge Gary presided over the morning session while Vice-President Schwab wielded the gavel during part of the afternoon session and Vice-President Topping during the remainder of the afternoon.

At a meeting of the directors held at noon, the officers were re-elected. Detroit, Buffalo and other cities extended invitations to the fall meeting but, after some discussion, it was decided it would be best to hold the meeting in New York, owing largely to the fact that few cities have hotel facilities adequate to accommodate the large membership of the Institute.

### Banquet Speeches by the Leaders

WHEN Judge Gary, as toastmaster, arose to greet the 1300 guests at the banquet Friday evening, he began by saying: "I extend to you 1300 welcomes," and introduced Joseph G. Butler, Jr., of Youngstown, Ohio, as "our Uncle Joe," who read in part an able review of what the American iron and steel trade did in the war. Mr. Butler's paper is published in full elsewhere in this issue of THE IRON AGE.

Judge Gary introduced Robert S. Brookings of St. Louis as a man who had become wealthy in business, and had spent a large part of his wealth on Washington University, St. Louis, of which he has long been, and still is, president—a man who, as member of the War Industries Board and chairman of its Price-Fixing Committee, had served his country with great ability and perfect fairness.

Mr. Brookings received an ovation from the guests who arose to greet him, and applauded him enthusiastically. He spoke briefly, saying that he had some experience in mining ore and coking coal and operating coke ovens, and had reason for investigating

costs of iron and steel products. He said he had been deeply impressed by the disparity of costs of different plants, and wished to express sympathy to steel manufacturers on account of cost conditions existing. He expressed his earnest appreciation of the broad, patriotic spirit displayed by the steel industries which had received all suggestions of the Government in the right way. "Without that co-operation," said Mr. Brookings, "we should have been frightfully handicapped; in fact, I do not know what we should have done." He commended Judge Gary for his infinite tact and unflinching patience, and predicted that when the industrial history of the war is written it will be a wonderful monument to the patriotism of the American manufacturers.

#### A Word to Young Men

At the conclusion of Mr. Brookings' remarks Judge Gary said he hoped he would be pardoned for digressing a bit to speak particularly to the young men of the iron and steel industry. "The war has ended,"

### Favors League of Nations

We now have reason to assume the peace terms will be agreed to and subscribed at least by the majority of Governments and that a League of Nations for the continued preservation of peace will be established. A large majority of the people of all countries are favorable to these results, and their desire and will must prevail. If the plan adopted, in form or substance, shall prove, by experience, to be imperfect or incomplete, corrections or amendments can be made later. If the plan turns out to be unworkable or unsatisfactory it can and will be abandoned. Naturally every one is wondering whether or not peace will be permanent or long continued. There are numerous things to be considered, too many for discussion or even reference at this time; but the controlling factor in this respect is one of fairness to all nations, taking all the facts and circumstances into account. If, at the start, either the treaty of peace or constitution of the League of Nations is manifestly unjust and unfair to any leading country it will turn out to be a temporary arrangement only. Honesty, justice, truth and Christian spirit are all kindred to and have a bearing upon the idea of fairness.—*Judge Gary's Address.*

he said, "but patriotism has not. The need for patriotism exists to-day as much as ever, and I wish to say to the young men that the best reward will come to those who, in dealing with their employees, their customers, and the public, conduct themselves with utmost fairness, with justice to all, and in a spirit of lofty patriotism. I bid you, young men, hold high the banner of honor in all business and other interests connected with the iron industry."

George W. Perkins, New York, director of the United States Steel Corporation, who recently returned from Europe, said that the countries of the old world had been amazed by the achievements of the steel industry of the United States, and especially by the lack of friction between labor and capital. He told of meeting 36 members of the Cleveland Chamber of Commerce in Paris, who had gone from Ohio to France to pave the way for business. He said to them that it would have been better for them to have gone to Washington instead of to Paris, for what business needs above all other things is assurance that it will be able to co-operate and not be compelled to subject itself to the competitive methods of the

### Cruel and Diabolical

It is to be presumed the Central Governments with their associates in the war will sign the terms of peace offered, or will at least submit to them. They are helpless and have no alternative. For this reason, if for no other, those who tender the terms of peace should be more considerate and painstaking.

At this particular time it is difficult for anyone connected with our side of the military conflict which has been raging to view the situation dispassionately. The precipitation of the war by the German leaders seems to us to have been unjustified and unconscionable; their conduct, brutal and remorseless; their treatment of captives and captured territory, cruel and diabolical; their disregard of law and right and human sanctity, barbarous and dastardly. This has outraged our feelings and inflamed our passions. It could not be otherwise. If we are thus affected, what must be the mental attitude of those who were in close proximity to the scenes of horror?—*Judge Gary's Address.*

past. Mr. Perkins said there is an amazing lack of information in this country in regard to methods of business and he thought that no opportunity should be lost to inform the country and especially the members of Congress and others in authority upon business topics. He believed that it is the duty of American Iron and Steel Institute to undertake the education of the people of the country in favor of co-operation and on all great economical questions.

Clarence H. Howard, president Commonwealth Steel Co., St. Louis, told of his recent trip through France and Germany and how he was impressed by the feeling of fellowship which had resulted from the democracy of the trenches, where men of all classes were associated in one great cause. He praised the work of the Y. M. C. A. in the highest terms, and made an earnest plea for the older business men to give more time and thought to the younger men and to the boys of the country.

Marcel Knecht, director Bureau of French Information, spoke eloquently of the winning of the war, and especially of the part played by the steel industry of the United States. He expressed the profound thanks to his countrymen for the help which had been rendered. One blast furnace at Senelle-Maubeuge, Longwy, which had been destroyed by the Germans, had been rebuilt and placed in blast a few days ago. This was only one evidence of the return of France to its proper place in the industrial world. He predicted that France would have its great steel leaders, its Garys, its Schwabs, and its Farrells, and he expressed the hope that the American Iron and Steel Institute at

### Unreasonable Restrictions

When we consider the preparation other nations are making to advance their pecuniary interests in every part of the world we must conclude that to maintain the position which we are entitled to hold we must be unfettered by unreasonable or unnecessary restrictions. If business, big or small, shall deserve to succeed, it will be permitted. As to exactly what laws or modifications or application of laws are necessary I may express opinions at another date or place, though I believe others more competent and occupying high official positions have already reached wise conclusions and will act accordingly.—*Judge Gary's Address.*

some not far distant time would visit France. He said the war had been won by steel and peace must be kept by a will of steel. He spoke as follows:

### Mr. Knecht's Stirring Address

"In 1917 I had the honor of reading to you a message from our high commissioner, André Tardieu, who praised your splendid co-operation in the war. I also appealed to you for a closer union between the steel industries of France and of the United States and, as a Lorrainer of Nancy, and member of the board of directors of the Industrial Institute of Eastern France, I expressed the hope that our two steel weapons would win the decisive victory.

"Mr. Butler and Mr. Brookings, who have just praised the unselfishness of the steel industries of the United States in their valuable co-operation with your government, will allow me to add the sincere thanks of France; we also wish to pay tribute to the steel industry and especially to the generous conception which equalized the prices for all the Allies. The iron of Minnesota and Alabama, the steel of Pennsylvania and Ohio, have liberated the iron of Lorraine and made it French again.

"The first engineer who foresaw the extraordinary future of our Eastern industries was the deputy of Briey, Albert Lebrun, who, as an artillery officer in 1915, was often obliged by orders to shell these mines, his birthplace, and later he became minister of blockade and of the liberated industries of France. Mr.

Lebrun said in 1909 that nature had already conceived Lorraine as a whole when forming its underground in complete harmony. The part of Lorraine occupied by Germany was separated from French Lorraine by a frontier, but, deep in the soil the iron mines extended from Nancy, Verdun, Briey, Longwy to Luxembourg and Metz; coal was to be found between Pont-à-Mousson and the Sarre district; salt was exploited from Nancy to annexed Dieuze and Château-Salins. Our mines could be compared to a gigantic hinge strongly fixed to the French ground; the gate which it had before 1870, the gate of Metz and Thionville had been stolen, but the hinge remained as a hope and a testimony.

"Through the heroism of your soldiers, through the efficiency and great vision of you, representatives of the steel and iron industries of America, the French Republic has once more the gate of liberty. And it is our former high commissioner, André Tardieu, one of the constructive peace delegates, who has particularly and successfully drafted the articles on the frontier of the Rhine and of the Moselle.

#### Treaty of Justice

"As I asked you two years ago to bring your steel sword to our help, I ask you to-day, on behalf of our millions of dead and of wounded, of millions of refugees and ruined populations to have, like us, like all our great allies, a will of iron in the normal execution of the restitutions, reparations and guarantees which international justice will impose upon Germany. If

#### May Meet Germans

Many of us remember with sadness our conferences with German and Austrian steel masters at Brussels. They were agreeable and satisfactory. It is within the bounds of possibility that representatives from all the steel producing countries of the world may hereafter, perhaps sooner than we now expect, meet to consider how best to advance the interests of all. We have never had business differences with any of them which would prevent our welcoming such a meeting. We would be fair, frank and honorable and, of course, would expect and exact reciprocal treatment.—*Judge Gary's Address.*

we had had Bismarck or Hindenburg at the peace conference, the peace treaty would have been a treaty of iron; the delegates of the Allies are only imposing a treaty of broad justice against the German bluff; let us unite our iron will against German insolence, against German hypocrisy; let us be as just to the pitiful victims of German brutality as to the torturers.

"The economic situation of France and of Belgium, burned, crippled, ravaged, is much worse than that of Germany; Mr. Vanderlip and Mr. Davison have already described the hardships of Europe. France has won an immortal, spiritual, moral and military victory. The last speaker described with enthusiasm his joy when, visiting Coblenz, he saw the Star-Spangled Banner floating on a German fortress, formerly the laboratory of the lowest form of culture. Close to Coblenz, the French flag decorating the fort of St. Quentin in Metz, has cheered and comforted my nation. But the people of France do not deserve to suffer an economic defeat and, with your brotherly help, will do their best to improve our financial and industrial situation. The North and East of France are still ruins and tombs. Our steel furnaces of the North and of French Lorraine are no more and, still, we see across the Atlantic Ocean the first star of hope. It is the same star which the three kings saw in Bethlehem; it is the same star which the French nation admired when Pershing and your first crusaders reached our shores; it is the same star which the Allies cheered when Foch was chosen by Clemenceau, by Wilson and Lloyd George.

"The symbol of the economic revival of France is the recent relighting of the first steel furnace of

#### Sometimes Mistaken

We have been made to more fully realize our duty and responsibility in reference to the Government, to each other and to all others who are connected with or interested in our affairs. We have been reminded in one way or another that we are selfish and sometimes greedy; that we are often narrow and unreasonable; that we are inclined to resent unfavorable criticism even though it is deserved. And we have learned to better appreciate the merits of others with whom we have been brought into discussion and decision concerning the matters which affected our pecuniary interests. We have been convinced that Governmental representatives who disagreed with us were right and that we were wrong; that because we were financially interested and they disinterested they had the advantage in debate and judgment. We must give credit to them for unbiased and intelligent consideration of our affairs. We should remember and profit by our experience in Washington during the last 18 months of the war. We always intended to be fair and reasonable, but were sometimes mistaken. Invariably the arguments against our contentions were presented intelligently, courteously and frankly.—*Judge Gary's Address.*

Northern France. Mr. Loucheur, minister of industrial reconstruction and Albert Lebrun, minister of liberated districts, who can be compared to Judge Gary, to Mr. Farrell, to Mr. Schwab, officially attended the ceremony at which one of the blast furnaces of Senelle-Maubeuge was put again in action. The director general of the company of Senelle, M. Dondelinger, after having described the enormous and systematic destructions, thefts and looting by the Germans in his plants, announced that the valuable help of the French Government and the patriotism of the engineers and workmen permitted them to relight this furnace, the first which would produce again iron for France. Minister Loucheur, who was deeply moved, praised the spirit of capital and labor and expressed the hope that, even with the 8-hr. day, production would be intensified, and that the steel industry of France would never work any more for war products steel.

"Gentlemen: We won because of our united steel; we will have a just peace because of our united will and let us maintain peace and human happiness through our united iron and will.

#### Invited to France

"There is no union between men if they have not been in touch individually. Why could not this powerful institute choose the month of July, 1920, to cele-

#### Just Punishment

Those directly connected with the cruel and criminal offenses against humanity during the war should personally receive adequate, even capital punishment if and when deemed necessary, not in a spirit of vindictiveness or revenge, but as an example to deter others from the perpetration of crime which is recognized by civilized peoples to be the purpose of personal penalties. The citizens generally of an offending and conquered country, to the extent of their ability, should make full reparation and restitution for all the damage that has been inflicted, except and unless the same is waived in whole or in part. But as to punishment of the people at large of any country, which might result in unnecessary personal and physical cruelty and suffering, notwithstanding all are responsible for the acts of their official representatives, it seems to me the conquerors should be merciful.—*Judge Gary's Address.*

brate the glorious Fourth and Fourteenth of July and visit the iron mines of Briey, Longwy, Noutiers, Pienne, Mont Saint-Martin, Homecourt, the steel furnaces of Joeuf, Hayange, Pompey; the leaders of industrial America would be warmly received by the industrial leaders of Lorraine, by the chambers of commerce of Nancy, of Metz, of Strasbourg, and by the industrial

institute of Eastern France. Our Government, and particularly statesmen like Loucheur, Lebrun, André Tardieu, Marin, François de Wendel, Deputy of Briey, and the President of the Comité des Forges de France would highly appreciate your coming to the district which represents the patriotism of greater France and its economic rebirth."

## Judge Gary on War and Business

AFTER the applause following Marcel Knecht's speech had subsided, Judge Gary said: "Now, gentlemen, what is your wish?" and from all parts of the banquet hall came shouts for "Schwab." Mr. Schwab was in his happiest vein, and after telling a few characteristic stories, spoke seriously of the problems ahead of the iron industry of the country. He said that when he had expressed to Marshall Foch his admiration for the way in which the war had been conducted, the great French soldier said: "We had a great orchestra, each nation playing its part and all in harmony, and that was the way we won the war. I merely held the bâton." Mr. Schwab said that that was the way in which the manufacturers of iron and steel must stand together and win the great victories of times of peace.

Judge Gary, in opening his address, spoke on the war at length and declared that in every substantial particular the iron and steel industry made good all promises. "There were," he said, "no deficiencies in quantities or delays in deliveries which were harmful. If these matters had been left entirely in the hands of the General Committee of the American Iron and Steel Institute there would have been no delinquencies whatever."

Judge Gary spoke with deep feeling of sons and other relatives of members of the institute who had made the supreme sacrifice, and added that "for all who entered the military service we entertain sentiments of gratitude." He said that he thought there was reason to assume that the peace terms will be agreed to and subscribed at least by a majority of governments, and that a league of nations for the continued preservation of peace will be established.

Turning to the present and the future economic situation, Judge Gary said that competition between the business men of this country and those of other countries, and between ourselves, however good-natured and friendly, will be persistent and aggressive, but that so far as members of the institute are concerned, it will not intentionally be wanton and destructive. "We have," he said, "learned the folly and the wrong of such a course." Continuing, Judge Gary said:

"But we believe that the underlying reason for precipitating the late war was economic and that the question which is uppermost in the minds of many, if not most of the representatives at the Peace Conference, is economic, and that a desire for economic advantage and success will actuate the political, financial and industrial administrators of affairs of all countries in future decisions and efforts. We have established friendships with our neighbors across the seas which are genuine and lasting. This will result in benefit to them and likewise to us. But we should not be deluded into the conclusion that any of them will neglect an opportunity to extend influence or to secure trade, or to profit, even at our expense, so far as the same can be accomplished by legitimate means. This is their right and we cannot reasonably object. However, so far as it is proper, we must be prepared to meet the competition that is sure to appear and we must be diligent, alert and vigorous."

### The Business Outlook

In conclusion Judge Gary said, in regard to the business director:

"Since the armistice was signed the steel industry has made two substantial reductions in selling prices, first by voluntary action, Dec. 9, and then, March 21, after consultation and discussion with the members of the Industrial Board of the Department of Commerce. There are incidents connected with the efforts of the Secretary of Commerce to stabilize conditions which interfered more or less with business activity. You are familiar with the subject. At present there is a perceptible and gradual improvement. It seems probable this will continue and increase. On the whole, our business during the last six months has been better than we had reason to expect. After what has occurred during the last few years it is wonderful that conditions are so good. As I have said before more than once, there is a large and fairly profitable business ahead. The necessities of the purchasing public are piling up. Some may wait too long before placing the orders under contemplation. As you are aware, the wheat crop of the season is enormous—far above previous calculations—and it will soon be harvested, threshed, transported and converted into cash. This will provide business and money for the carriers. What they will do with it I cannot say, but they probably will make some necessary improvements in roadbed and equipment. Other crops will soon be coming on. From present appearances the production this year will exceed all former records.

### Confidence in the Future

"The price of copper is increasing. It is expected to be selling in the near future at 20 cents. Most, if not all, of us are making expenditures in preparation for the future business that is coming. Go into the large new hotels and witness the crowds. Secure a room, if it is possible, and then make inquiries of travelers from the far West, Southwest and South, and you will hear good reports. They have confidence in the future and are acting accordingly. Look for a pessimist. You will find he is a rarity. Enter a jewelry store, or retail stores generally, and you will be surprised by the number of purchasers. Gaze upon the throngs of people on the city streets and the double rows of automobiles, going in either direction. Visit the country and be astonished by the number of motor cars. Inquire for a house in New York which is for rent or sale and see for yourself that they are scarce and that prices are advancing. It is remarkable how many evidences of business activity there are. Gentlemen, the people of this country are rich and growing richer. It is estimated the wealth of this country is equal to one-third or more of the total wealth of all countries; that there is held by the banks fifteen or sixteen billion dollars; that the money in circulation is about \$56 per capita, as against about \$34 before the war. What is it to be supposed will be done with it? Why, invested and expended in order to increase wealth. Perhaps you and I will get some of it, and if so, we will expend or invest it, for we are like other human beings. There is still room in this country for the optimist, but little space for the pessimist. If the tax assessor and collector will only permit us to retain a little fairer percentage of our earnings, we shall be happy; and we are beginning to see a gleam of light on this subject.

"Patience and confidence are justified, and, with these, great prosperity is assured."

*Abstracts of the various papers presented at the morning and afternoon sessions will be found on the following pages. Most of the discussions are also given in part.*



DR. S. W. STRATTON



F. F. MARQUARD



T. F. BAILY



J. A. MOHR

Four of the Speakers Who Presented Papers at the Spring Meeting of the American Iron and Steel Institute

## Electrically Heated Soaking Pit

— BY THADDEUS F. BAILY \*

THE introduction of electrically heated furnaces to the heating operations subsequent to melting and refining in the steel industry has experienced the slow development incident to the introduction of all radical innovations in any industry. Many of the types that will find wide application in the future, while entirely feasible, have, when offered, been met with the statement that if such an equipment was a good thing, why were they not in general use. Other types, that have been in regular service for a considerable number of years, whose construction and operation are much more elaborate and whose commercial advantages are no greater, are now generally accepted as the most rugged and reliable equipment for the purpose. This latter refers to electric furnaces for the annealing and heat treatment of steel.

### The Electric Soaking Pit

The electric soaking pit for hot ingots is perhaps the most promising development of the electric furnace in the steel maker, as the shortcomings of the present pits—whether of the fired or non-fired type—are well known, and many troubles of the rolling mill can be traced to the present type of pit. The principal recommendation of the present type of pits, either of the fired or non-fired type, is the low fuel consumption per ton of metal soaked. This cost in a well handled pit is almost a negligible item, amounting frequently to only a few cents a ton.

However, in the larger mills, when running at full capacity, features such as lack of uniformity in temperature of the heated ingot, excessive oxidation of the ingot, and the like, are often such as to quite outweigh the item of mere fuel cost; and while it is to be admitted that electric pits cannot compete with fuel fired pits under ordinary circumstances, when heating cold ingots, the time is not far distant when substantially all modern mills rolling hot ingots will use electric pits for this part of steel mill operation.

It has been difficult to overcome the prejudices against this innovation in ingot soaking; but the advantages to be gained are so apparent, and the success of electric furnaces in other similar fields has been so marked, that it will not be long until electric soaking pits will be in commercial operation.

### Wall Losses

From electric furnaces operating at the same temperature, or at even higher temperatures than that required in soaking pits, and which have been operating over long periods of time, it is apparent that the stand-

by, or wall losses, of a typical pit adapted to hold sixteen 3-ton ingots will not exceed, as a maximum, 1000 k.w., and will be expected to operate on considerably less current.

However, taking 1000 k.w. as a basis, which is amply safe, and when operating on hot ingots, whose super-heated interiors are sufficient to bring to temperature their colder outer shells; and operating on a soaking time of one and one-half hours, the capacity per pit will be 32 tons per hr. with a figure of 1000 k.w. per hr. for the furnace, the current consumption per ton of metal soaked would thus be 35 k.w.-hr. per ton; and taking as a basis of cost of electricity in the steel mill of one-half cent per kilowatt, the cost per ton of metal soaked would be  $17\frac{1}{2}$ ¢, to which might be added a cost of 5¢ per ton for renewals and repairs, making a total cost of 22½¢ per ton for these two items.

It is to be expected that this cost for heat may be in excess of similar costs for gas fired pits or unheated pits; but when taking into consideration that the electric pit will eliminate the roll breakages due to cold ingots; delays in the mill due to ingots unevenly heated; oxidation, thus producing a cleaner bloom and an actual saving in metal due to this elimination of oxidation, amounting to perhaps one-half of 1 per cent; as well as the ability of the electric pit to save labor; it is certain that the higher cost will be more than offset by the advantages, and that per ton of metal rolled in a given period, the actual cost by the use of an electric pit will be less than by other means.

The illustration shows the general arrangement and character of such a pit. This pit will be provided with eight holes, instead of the usual four, and in consequence only half as many ingots will be located in each cell.

The resistance elements themselves, composed, as in all furnaces of this class, of broken carbon thrown loosely into a carborundum fire sand trough supported on brick pillars, are located along the outer wall of each side of the pit, and protected against the liability of serious accident from the ingot by being recessed some distance back from the ingot cell itself. The heat from this resistance element, it will be noted, is radiated to the circular wall of the pit, and thence to the cover, the partition wall of the pit, and to the ingots themselves. The cross section of this resistor element is such that there is very little difference between its temperature and the ruling temperature of the pit; and in actual practice most of the heating is done by the walls of the pit itself, rather than by direct radiation from the resistor element—this being of the highest importance in obtaining uniformity of heating.

\*The author is president, the Electric Furnace Co., Alliance.

In cases where the ingots cannot be delivered to the pit with enough heat for them to reach a high enough temperature without the addition of more heat from the pit itself, a longer time will be required by the ingots to bring them to temperature, and at the same time the capacity of the pit in tons per hour will be reduced.

But taking as a basis, ingots whose average temperature would be 1800 deg. Fahr., requiring 300 deg. additional for bringing them to temperature, the capacity of the pit would be reduced to 24 tons per hr., the electrical capacity of the pit increased to 1500 k.w., and the current consumption increased to 60 k.w.hr. per ton.

While with ingots charged at an average temperature of 1500 deg. Fahr., the capacity of the pit would be reduced to 16 tons per hour, and the current consumption increased to 90 k.w.hr., without increasing the electrical capacity beyond 1500 k.w.

Thus we have for a total of heating costs, including the renewals and repairs, and with power taken at  $\frac{1}{2}$ c. per k.w.

For hot ingots.....	22½c. per ton
For ingots at 1800 deg. Fahr.....	35c. per ton
For ingots at 1500 deg. Fahr.....	50c. per ton

the final temperature in each case being taken as 2100 deg. Fahr.

These figures can be safely taken as guarantees, and it can be expected that they will be much bettered

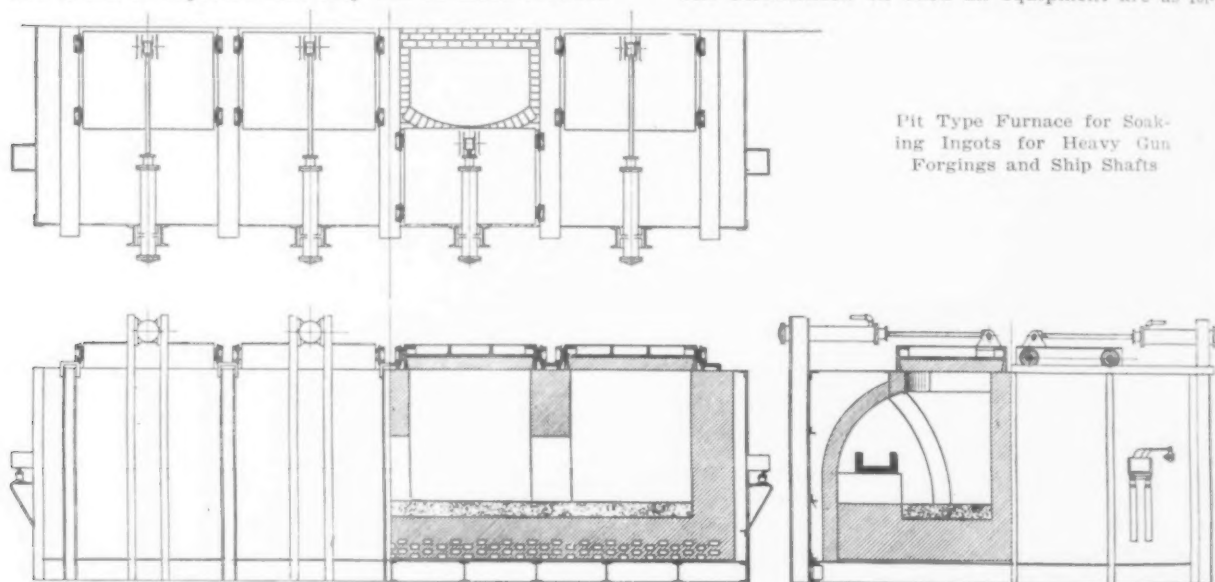
as  $\frac{1}{2}$ c per kilowatt in steel mill power costs, the fuel cost for cold heating in units of this size would be \$1.50 per ton.

This cost will compare favorably with direct coal-fired furnaces of similar capacity, and will actually show some commercial advantage, when taking into consideration the saving in metal due to scaling, which may readily run several per cent, and at least in average operating conditions may be taken as 2 per cent, and under the worst conditions 5 per cent, which has been actually observed in one or two instances.

Furnaces of larger capacity than the one described, of course, show a less favorable comparison to the electric, and furnaces of smaller capacity show a more advantageous comparison with the electric furnace; and it is believed that in any case, the cost of material heated in furnaces of this size, all things considered, may be safely taken as running very close together, with the electric furnace having the advantage in greater uniformity of temperature and other incidental advantages, including a higher yield of good finished pieces.

An application that it is believed will find favor in certain steel mill operations is the use of an electric furnace for re-heating billets for finishing mills, where in the blooms or billets coming from one mill are too cold to put into the finishing mill and will require approximately 200 deg. additional heat.

The calculations on such an equipment are as fol-



in actual practice and operation over long periods of time.

#### Continuous Type Re-Heating Furnaces

It is believed that this type of furnace will find wide application in the heating of cold steel for forging and rolling in relatively small capacities, and in re-heating steel of high quality; but where very large tonnages of cold rooms or billets are to be heated, a combination fuel and electric furnace—to be later described—will be better adaptable for such work. Another illustration shows an all electric billet heating furnace. This furnace was built for heating 3¼-in. round billets for shell forgings, and while the current cost for supplying this particular furnace was high, and the operating conditions not particularly favorable, nevertheless the reduction of rejections of forgings due to eccentricity, the saving of the dies due to the elimination of scale, and other advantages, such as better working conditions and simplicity of control, enabled the results to compare favorably with coal-fired practice.

This furnace was of 600 k.w. capacity, and in actual practice handled 1½ tons of steel per hr., with a current consumption of a little over 450 k.w.hr. per ton, or a thermal efficiency of a little more than 50 per cent. Under more favorable conditions, an efficiency of 66 per cent, or a current consumption of approximately 300 k.w.hr. per ton has been obtained. So that with low cost of current, which it is believed may be taken

low, for a capacity of 15 tons of 4-in. sq. billets per hr., charged into furnace at 1800 deg. Fahr. and brought to 2000 deg. Fahr. Such a furnace would require 800 k.w. per hr. for its operation, and somewhat under 60 k.w.hr. per ton of metal re-heated, and with  $\frac{1}{2}$ c for power, this would make a cost of 30c per ton of metal thus re-heated. As an electric furnace of this character would undoubtedly save one-fourth of 1 per cent of metal over fuel-fired furnaces, which would amount on steel worth \$40 per ton to a saving of 10c per ton, and then taking into consideration the low efficiency to be expected of a fuel-fired furnace of this character operating on hot billets only, there would be a decided advantage in the use of the electric furnace for such an operation.

#### Electric Heat Treatment of Rails

Large heat treating furnaces of the automatic type, whose certainty of operation and precision of treatment have been clearly observed over several years, justify the consideration of the heat treatment of large tonnages of heavy material, such as steel rails. The building of equipments for such purposes presents no serious difficulty.

It is readily apparent that the heat treatment of rails is highly desirable, as the increased physical properties readily obtainable by a proper treatment are such as to remarkably increase their efficiency, if not only adding to the life from the standpoint of wear,

but adding materially to the ultimate strength and the elastic limit, without appreciably sacrificing the ductility or toughness; and the only real question that can be raised is whether successful heat-treating equipment can be found wherein every rail treated will have exactly the heat treatment specified, and whether such equipment can be rugged enough to operate with precision over long periods of time, and the cost of operation come within a reasonable commercial range.

The furnaces described in this paper, especially those of the automatic type, which have records of years of successful service, I believe fully answer the question as to precision and reliability.

As to the special requirements of an equipment for the handling of rails, this will require, of course, a rugged quenching mechanism that will prevent a 33-ft. rail section from twisting during the quenching, and perhaps a similar mechanism after the drawing operation. Such an equipment will have the advantage of complete elimination of the gag press operation now admitted to be one of the principal undesirable operations in the making of steel rails.

As to the commercial cost of the heat-treating operation, as compared with the increased physical properties, it may be stated that the actual cost for electric heat under the conditions named in this paper would not exceed \$1.50 per ton, and the labor cost would probably be no more, and perhaps less, than is now required in the straightening press operation above referred to. The ultimate strength of the rail would in all probability be increased more than twenty-five per cent, and the elastic limit perhaps doubled, while the life of the rail from a wearing standpoint would undoubtedly be materially increased. I believe it is a conservative statement to say that a 25 to 50 per cent more effective rail from a wear and safety standpoint could thus be obtained at an additional cost per ton of not to exceed five per cent.

#### Predictions

The equipments described in the latter part of this paper are the forerunners of electric furnaces of the type that will soon come into regular use for operations on a far larger scale than will generally be conceded by the average steelmaker today, and will embrace the wide and almost exclusive use of certain types, such as the soaking pit and certain forms of the re-heating furnace first mentioned in this paper. While in some cases there will be an actual reduction in cost of operation over present methods due to the electric furnace, even for steel of average quality, the more rigid requirements in finished product will in some cases compel the use of electric furnaces.

Many of the arguments used against the introduction of electric furnaces were used against the introduction of large motors in the steel mills, and against electric haulage, and the statements frequently made through all the years about any innovation that "it has not been done and it cannot be done" must gradually yield, as one by one the various types of electric furnaces from heat treating equipments to soaking pits go into regular, commercial and economical service.

#### Discussion by Prof. J. W. Richards\*

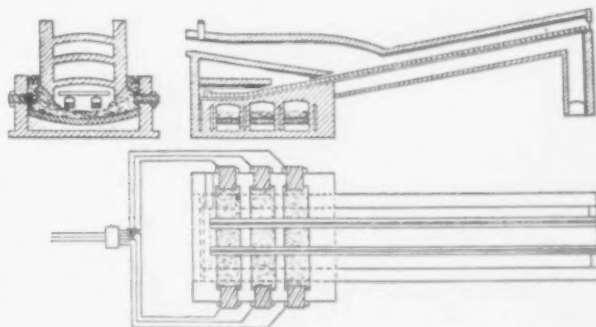
Mr. Baily's paper has two outstanding characteristics: First, the careful record of very successful practice already initiated; second, the modesty with which he forecasts the extension of these methods in the steel industry. Mr. Baily has wisely compared the cost of electric heating with that of fuel heating under conditions most favorable to the latter. He has assumed almost a minimum cost of fuel, and therefore the least favorable conditions for its replacement by electric heating. On the other hand, he has assumed the cost of electric power at  $\frac{1}{2}$  c. per k.w. hr., at which price it can be generated in almost any steel works district, and has left to be inferred the greater economy of electric heating where electric power may be obtained at lower figures, such as 0.4c. per k.w. hr. in the neighborhood of Niagara Falls, and 0.3c. per k.w. hr. near still cheaper water powers.

\*Professor of Metallurgy, Lehigh University, Bethlehem, Pa.

We must not overlook the fact that steel mills have been built where fuel was cheap which is, generally speaking, where cheap hydro-electric power is not available. We should consider the possibilities open by using Mr. Baily's electric heating furnaces at points where fuel is dearer and electric power cheaper than the figures he quotes, that is the possibility of extending the methods to regions considerably removed from cheap coal. As an extreme example, the Girod steel works at Ugines, France, is far removed from cheap coal, but is run entirely by very cheap electric power. They should use none other but these electrically heated furnaces. In between this and the ordinary practice at steel-producing centers are many works which will find it immediately profitable to install the electric heating furnaces.

A second point I wish to make is that Mr. Baily makes a very liberal allowance for stand-by, or wall losses in his furnaces; he assumes 1000 kw. as necessary to simply hold the temperature in a 16-ingot, 36-ton soaking pit. It is entirely proper for him to make this liberal allowance, but I am confident that a scientific study of the construction of the walls of the soaking pit, and particularly of the radiating surface of the outside of these walls will reduce this figure very considerably—perhaps even cut it in half.

Iron and steel men do not pay a fraction of the attention which they should to reduction of radiation losses from furnaces and very hot apparatus. They paint surfaces black, the best color to radiate heat, when they should be painted white. They smile the sarcastic smile of contented ignorance when it is suggested to them that heat losses can be largely diminished by



Combination Gas and Electric Billet Heating Furnace

proper attention to the radiating surface. Tell a foundryman that heat could be saved in sufficient quantity to pay well if he had the outside of his furnaces nickel-plated and kept them bright, and he would probably regard his informer as demented. Yet in many cases the statement would be true and doubly true of electric furnaces.

I strongly urge the use of white aluminum paint as one step in reducing radiation losses on furnaces. Some of our laboratory furnaces are encased in polished Monell metal; it would undoubtedly be well to encase steel works electric furnaces in this manner. Even bright nickel-plating of ordinary iron shells would in most cases pay for itself in heat saved in a short time.

I plead with practical men not to ignore these "laboratory" suggestions; they are practical and they will save money. Mr. Baily's whole article is a demonstration of the possibility of extending the precision, accuracy and economy of laboratory methods into the steel mill. An extension of this work will mean almost the remaking of our steel industries. These are the directions for scientific progress in the steel industry.

#### Discussion by W. G. Kranz\*

The pioneer in any field always has a hard row to hoe, and in the industrial field especially, as he is always confronted by the question, "What is the relative operating cost between your method and that which is generally used?" and consequently the burden of proof rests with him. There are very few cases where the fuel cost is in favor of the electrically heated furnace so that economies in other directions must be looked

\*Vice-President National Malleable Castings Co., Cleveland.

for, but doubtless it is very true that the electric treating furnace has lower labor cost for operation, less oxidation of the material being treated and by far better and more uniform heat control than any other type, and by reason of these virtues it has a great many advantages where a rigid specification is to be met. But these latter economies are not easily converted into dollars and cents, so it's all the more difficult for the pioneer to drive his arguments home.

I might say that in two of the types of furnaces mentioned in Mr. Baily's paper there has not been a single instance where the failure of the material to pass the specifications was due to the lack of uniformity of treatment. There is probably one class of heat treatment for which the electrically heated fur-

nace is not the most economical and that is for annealing where the heat cycle requires very slow cooling. In this case the combustion furnace can utilize the heat dissipated by the cooling material to support the combustion in the heating portion of the cycle, and the muffle type has many of the advantages of the electric.

With the increasing demand for more economy, better materials and consequently more rigid specifications the electric heat treating furnace, I feel, has a very bright future; and we all fully realize that the introduction of this type of furnace into the industrial field has spurred every other designer and operator of the combustion furnace onto greater endeavors, which undoubtedly will tend to fulfill a long felt want in the metallurgical field.

## The Standardization of Ship Materials

A MOST comprehensive paper on standardization of ship materials was presented by F. T. Llewellyn, Federal Shipbuilding Co., Kearny, N. J., and the Chickasaw Shipbuilding Co., Mobile, Ala. Until lately he was in charge of steel standardization for the Emergency Fleet Corporation. His paper, with its statistical appendices, covered 58 closely written pages, and only a small part of it can be given here.

Emphasizing the importance of distinguishing between standardization of types, designs and materials, Mr. Llewellyn pointed out that while the possibilities of standardizing the various types of ships might be limited by differing conditions of routes, harbors and service, yet standard ranges and grades of material can be applied to any ordinary types and designs. He devoted the body of his paper to an outline of the need, history and possibilities of standardization in connection with the materials required for freighters, whose steel hull structures constitute some 75 per cent of the weight and 50 per cent of the cost of the entire ship.

### Ships and Bridges Compared

He compared the requirements of such ships with those of rolling stock and bridges, defining a ship as a storm-tossed box-girder, a freight tank, a power house and a floating hotel, all combined. He said in part:

"The popular notion that her stresses are indeterminate is no more correct than in the case of fixed steel structures. The origin of design in both classes of structures was an accumulation of empirical rules, and in both cases theory has simply afforded an intelligent means of comparing the probable safety of an untried design with one whose behavior is known. The Titanic is matched by the Tay and the Quebec bridges.

"The design of a ship, however, has one advantage over that of a bridge. When once built the bridge is largely left to the mercy of the elements (and of constantly increasing train loads), whereas on each voyage the captain of a ship has it within his power to stow and navigate in such a manner as to minimize the menace of the waves. It is of course true that this menace may reduce the safety factor of ignorance to a greater extent than in the case of a bridge.

"The ship designer is also fortunate in being able to utilize the upward reaction of buoyancy at each cross section of the ship in reducing the stresses caused by his dead and live loads, the maximum longitudinal bending moment amidships being roughly only one-fourth of the moment that would result from a uniformly distributed load equal to the weight of ship and contents on a clear span equal to the length of the ship, but this proportion does not hold at other points fore and aft.

### Uniform Set of Rules Desirable

"The classification societies, realizing that dangerous errors, due to inexperience, oversight, or (in rare cases) unscrupulousness, might accompany the preparation of stress diagrams for each design, have

saved the purchaser and the shipbuilder the time and labor that such calculations would require by publishing tabulated rules giving the scantlings recommended for the various hull members in ships of the more usual types and dimensions. These rules are revised from time to time in line with experience based on the constant survey of both the construction and operation of ships. It is to be regretted, however, that the eight principal classification societies have not as yet agreed among themselves on a standard set of rules.

"The authority of the better known societies is justly great, but emphasis should be laid on the fact that classification is not refused for variation from their rules provided the substitutions are equally efficient; and this privilege broadens the possibilities for standardizing ship materials. For example, practically nowhere in a ship do the members that constitute the framing consist merely of single rolled steel shapes, for while they may appear to do so it will be noted that one or both of their flanges unite with the heavy plating of the shell, deck, or double-bottom tank-top strakes, or of the bulkheads, to form compound members wherein the plating is generally the most active element, on much the same principle as that followed in ferro-concrete construction, where a part of the floor-slab is utilized as the compression flange of a Tee beam or girder. This arrangement permits of substitutions in the size and thickness of the elements in such compound members, for undesirable variations from the adopted standard range of shapes can frequently be avoided by modifying the plate thickness, and vice versa.

### Differences in Terminology

"A semi-medieval custom, whose effect is not always realized, has tended to befog the steel engineer in his efforts to clarify the application to ships of his experience in other structural lines, namely, the terminology employed. This is due not so much to the use by shipbuilders of special terms, but rather to the employment by both ship and bridge builder of common terms but with different meaning, and of different terms with the same meaning. Thus, the 'dead-weight' of a ship is the 'live load' on a bridge. The structural engineer would call the 'floors' of a ship 'floor girders,' while his 'floors' are known in a shipyard as 'decks.' The 'web-frames' of a ship correspond to bridge 'portals,' her 'cant-frames' to 'skew-portals,' and her 'bulkheads' to 'diaphragms.' The 'foundations' beneath a ship's machinery would be known on land rather as 'grillage,' while a marine 'erection' is confined to 'superstructures.' The shipbuilder usually restricts the terms 'gusset' plate and 'stringer' to horizontal members, preferring the respective terms 'bracket' and 'girder' if they are vertical, and plain rolled steel 'angles' are not classed as 'shapes' in the older shipyards, whereas rolled steel 'bars' are frequently so included. The 'shell' of a ship might be termed 'skin' by a structural engineer, who would 'furnish' or 'attach' members that in ship parlance are 'fitted,' and he would put a 'crimp' in plates or frames

that on the ways are 'knuckled.' In those rare cases when bridge or building connections have to be made from field templates they are said to be 'Manley'd' by our biggest fabricator, whereas on a hull they are 'lifted' from the frames.

#### Far-Reaching Benefit of Standardization

"Some old-line shipbuilders have argued that the cost of the plain material in a ship is a comparatively small percentage of the finished hull, and that the need for standardizing ship materials is therefore not so urgent. Such an argument overlooks the most vital aim of standardization, which is to increase production by simplifying all the processes involved—at the rolling mill, in the shop, and on the ways—although as regards material cost alone it is reasonable to believe that in the long run better terms, as well as service, may be procurable from the rolling mills for a tonnage that is attractive from the standpoint of mill operation, as opposed to one requiring too frequent roll changes or other irksome features."

After narrating in detail the confusion and delay during the war, caused by the great variety of different sizes specified and ordering practices employed, Mr. Llewellyn said:

"These were the factors responsible for the so-called 'lag-lists.' These were the odds and ends that threatened to render unavailing the strenuous efforts of the rolling mills to ship in sequence and that encouraged an otherwise unnecessary 'cushion' of reserve stock at one time aggregating over a million

tons. These were the conditions that made it possible for one of our large shipyards to have received some 30,000 tons of steel without having on hand enough of the proper sizes to allow them to proceed with the construction of a single ship. The responsibility for these conditions was as usual divided, and need not be reviewed at this time.

"The important thing was to remedy the situation, and here again the credit should be divided, for it was only by the hearty co-operation of the Emergency Fleet Corporation, the steel makers, the fabricating shops and the shipyards that a practical form of standardization was achieved.

#### Results Achieved by Standardization

"It is gratifying to note that early in 1918 the industry was benefiting from the degree of standardization then accomplished. As a result of the uniformity of specifications received, one of our newer plate mills, with a normal capacity of 12,500 tons per month, was enabled to increase its product to 16,000, 17,240, 18,025, 19,145 and even 20,973 tons per month.

"As regards shapes, the shipbuilders are substituting the standard sections now recommended as rapidly as the progress of their work will permit, and it has been possible by the elimination of odd sizes, to design a 9400-ton ship with only 16 different shapes and 44 thicknesses of section, as opposed to the former averages of 28 shapes and 73 thicknesses per ship, and this was evidently accomplished without increase in weight of steel, for the builder asked no increase over the agreed price for the ships."

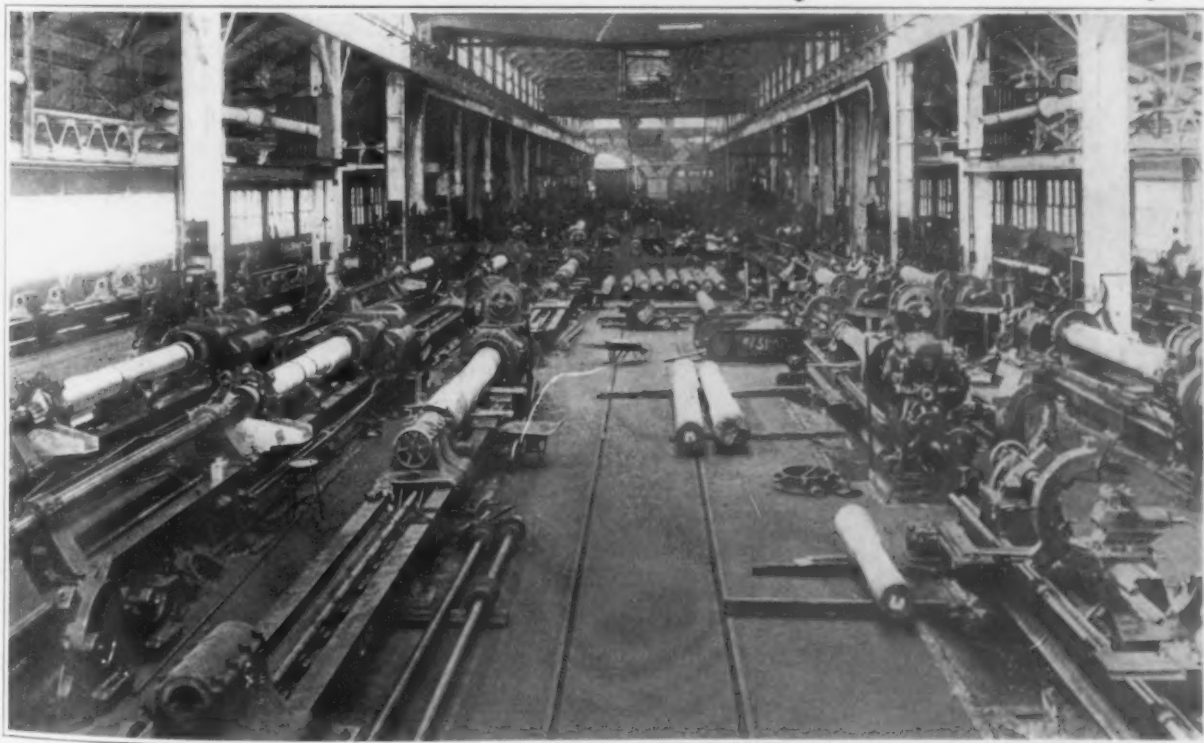
## The American Bridge Co.'s Forge Plant

—BY C. J. WALKER\*

THE American Bridge Co. produced its first forgings in 1871, at its Chicago plant. From time to time since that date, plant enlargements have been made. The most important of these enlargements made necessary by the entrance of our country into the world war was at the Gary plant. We were called

ing and annealing shops, chemical and physical laboratories.

The erection of the ordnance plant commenced early in December, 1917. Less than three months later, Feb. 1, 1918, the forge building was practically completed, although the winter weather was exceedingly

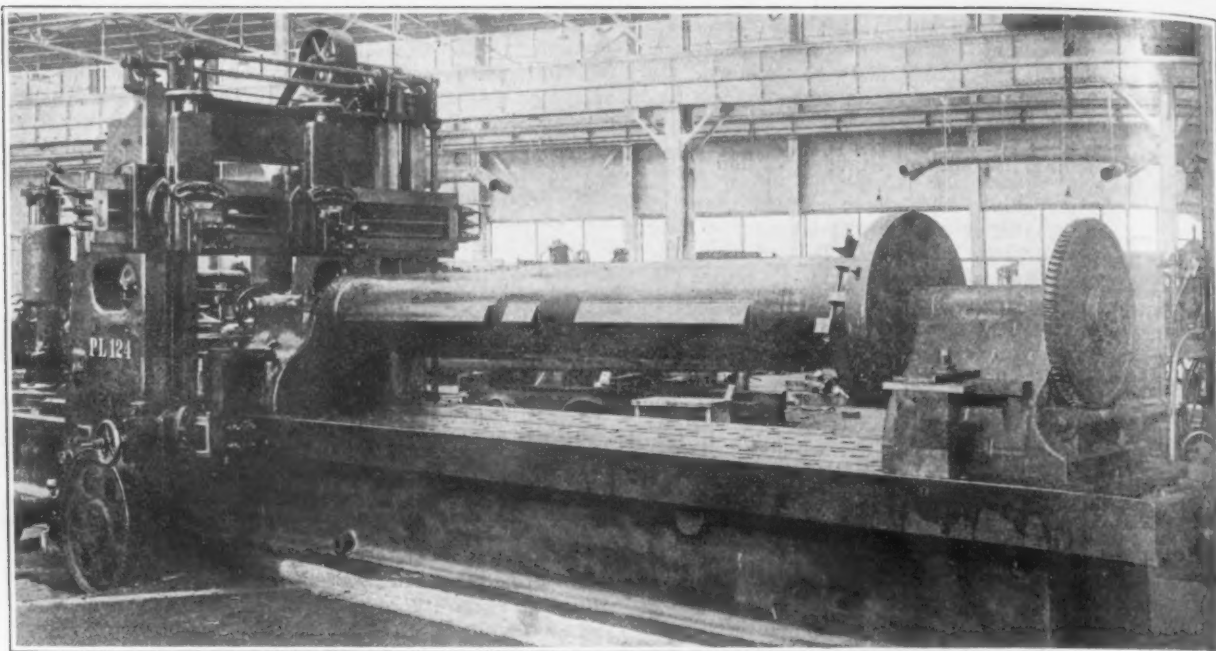


Machine Shop No. 1 of the American Bridge Co.'s Forge Plant, Gary, Ind.

upon to produce forgings rough machined and heat treated for the manufacture of 155 mm. guns, 8-in. railroad guns and 240 mm. howitzers. This necessitated the erection of a forge shop, machine shop, heat-treat-

severe, unusually heavy snow storms greatly handicapping the work. In five months, or in April, 1918, steel work on all buildings was about 80 per cent completed and fires were burning in some of the heating furnaces in the forge shop. By the end of July, or

\*The author is manager of the Gary plant.



Attachments used on Planer to Enable the Machining of 155 mm. Hoop and Jacket. The triangular lugs or guides stand in the way of the piece being turned in an engine lathe

eight months from start of the erection, all buildings and foundations were practically completed.

The forge heating equipment arranged along the west wall of the shop, consists of 15 2-door coal-fired furnaces, capable of taking ingots to 78-in. diameter. The coal for the furnaces is conveyed to the hoppers by a Robbins conveyor, and is fed to the furnaces by means of American underfeed stokers. Waste gas from

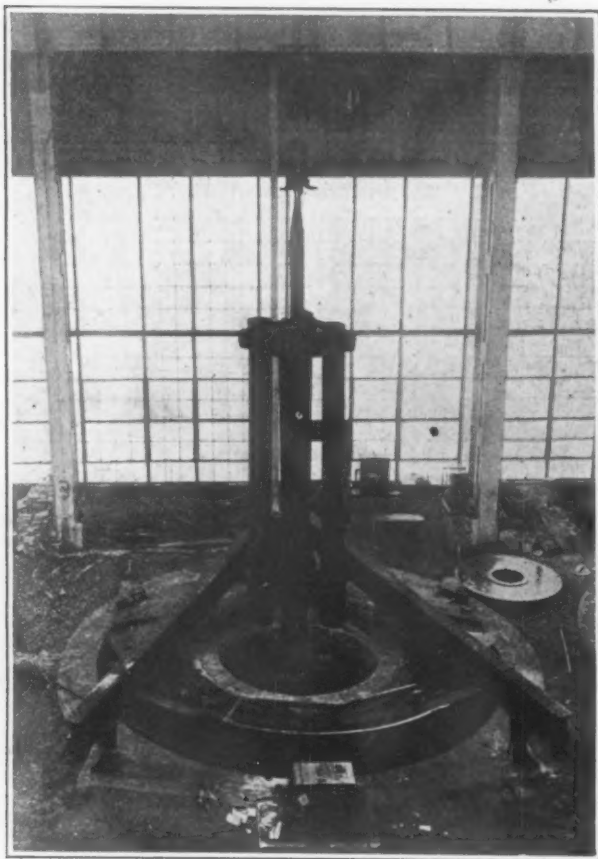
a single-leg electrically operated gantry, complete with electric turning gear, running over the top. Three electric cranes of 80-ft. span operate above the gantries. The maximum weight of forging which may be handled is 75 tons. Gun forgings were made from electric nickel steel obtained from the South Chicago works of the Illinois Steel Co. The smaller forgings were made from blooms, while the larger ones were made from ingots which were received hot from the mill. Ingots were kept hot during transportation by means of special sand and asbestos-lined cars. Upon arrival at the forge plant, the ingots were immediately charged into the heating furnaces.

The initial forging operation was performed on the 1000-ton press April 24, 1918; the first gun forging consisting of one 155 mm. tube was made May 6, 1918. The first of the 2000-ton presses was placed in service May 15, 1918. The 3000-ton press is an improved design for machines of this rating.

The machine tool equipment of the three machine shops consists of 33 turning lathes, 38 boring lathes, 18 planers, 2 slotters, 8 horizontal core drills, 5 test bar grinders, two 62-in. and one 90-in. cold saw, and a miscellaneous tool room equipment. The initial machine operations on gun tubes after centering is turning. The forging is turned to about  $\frac{1}{2}$  in. above finishing size and is then placed in the boring lathes where the boring is completed. The boring operation was performed by female operators in a very satisfactory manner. The outer surface of the jackets for the 240 mm. howitzer and the 155 mm. gun is made up of curved and planed portions on the same transverse section and in order to plane these pieces they were mounted between rotating centers on bed planers.

The heat-treating building is served by one 15-ton crane, 40 ft. from the floor, and one 50-ton crane, 75 ft. from the floor. The heat-treating equipment consists of four vertical down-draught oil-fired furnaces, varying in depth from 26 ft. to 45 ft., and diameter 7 ft. 10 in. and 9 ft. 10 in., with two quenching tanks, 26 ft. deep by 19 ft. diameter and 45 ft. deep by 16 ft. diameter, with a capacity of 120,000 gal. The first gun forgings were heat treated June 29, 1918. The annealing and drawing operations were performed in 12 30-ft. oil-fired, car-bottom furnaces, eight of which may readily be converted to four 60-ft furnaces. All furnaces were supplied with a complete equipment of Leeds and Northrup recording and indicating pyrometers.

The cutting of test bars from the treated material was done with special tools and equipment, designed and built at the Gary plant, which made possible an average feeding rate of  $\frac{1}{4}$  in. per minute. The special



Heat Treating Four 240 mm. Tubes in Down-Draught Oil-Fired Vertical Furnaces

each furnace passes through Wickes waste heat boilers, which generate steam for the presses.

The steam hydraulic press equipment, consisting of one 1000-ton, two 2000-ton and one 3000-ton United Engineering high speed machines, is arranged along the east wall of the shop, each press being served by

features of this equipment were a small six-lipped high-speed steel cutter attached to a hollow boring bar; and the use of high pressure air and lubricant. The high pressure air admitted to the interior of the hollow bar completely removed all chips, thereby preventing the breakage of cutters and making possible the use of a rapid feed.

Another tool of considerable interest developed at this plant is a live center boring head with which it was possible to remove 700 lb. of chips per hr. from a 9-in. diameter hole.

The critical part of the typical ordinary boring head is the point of the cutter. This point instead of cutting the metal, actually removes it by scraping. With the live center head, the metal at the point is removed efficiently by a 3-in. drill running at the proper

speed. The factor, therefore, which determines the feed to be used in drilling large diameter holes depends largely upon the removal of the metal at the center. With the live-center drill it is customary to increase the number of cutters in the head, thereby maintaining the work done per cutter at about the same value as with the ordinary head. After acceptance of test, the test metal portion on each end of the forging was removed by cold sawing and the piece was ready for shipment to the finishing plant. Fully equipped laboratories made possible the complete chemical and microscopical determinations.

Since the completion of the ordnance program, it has been found that the plant is admirably arranged and equipped for the manufacture of various types of hollow and solid forgings rough and finished machined.

## The Bureau of Standards and Industrial Research

THE "Work of the Bureau of Standards as Related to Industrial Problems" was the subject of an informal address by Dr. S. W. Stratton, director of the bureau, Washington. Lantern photographs were shown of the principal standard instruments used by the bureau for determining the various necessary qualities of materials which that department of the Government is called upon to test, either for purchase by the Government or for other reasons. The burden of the address was the revelation of the extent of the work largely as a result of the war.

The Bureau of Standards, said Dr. Stratton, desires to serve and does serve as an intermediary between user and manufacturer. Therefore, if all thus concerned grow more fully to appreciate the need of standards to measure quality difficulties which were numerous in the past will gradually disappear. The value of the movement to the public in general, he pointed out, is most important.

The metallurgical phase of the bureau's work is a matter of the utmost importance and much stress has been laid upon it and its work in the future is regarded as of considerable weight. Two large laboratories have been erected which during the war were devoted to war problems, but which are now engaged in the solution of industrial research and the solving of industrial problems. If these many problems are to be solved successfully, said the speaker, co-operation between such organizations as the American Iron and Steel Institute, the various steel companies and the bureau are essential. Dr. Stratton regretted that he did not have time to give a list of the problems now confronting the bureau in this particular department which, he said, were many, a large number of them being based upon questions in physics and chemistry. The work of the bureau, he said, is designed to be entirely helpful and fraternal toward all industries, including the metallurgical, and not paternal.

Besides the illustrations of standard weights and precision balances thrown on the screen, a test car including weights for testing industrial and railroad scales was shown. The car is sent to industries all over the country for correcting their own scales. At least 50 per cent of the scales tested had been found incorrect. The intricate work in connection with the formulation of standards of length was gone into and a view shown of the standards evolved on which the manufacture of precision gages for munition work was based, which was by no means a small matter in winning the war.

Standards for electrical measurements, for thermometers and for the determination of the expansion of materials were also shown, as well as devices for measuring the radiation of heat, especially the testing of Liberty motors under conditions in which they would have to operate when 30,000 to 40,000 ft. above the earth. Developments in the perfection of photographic methods where the red end of the spectrum is involved, especially as applied to the

taking of the photographs from airplanes through fog and mist, was an interesting explanation.

Another important work of the bureau which was pointed out was that of the devising of instruments for detecting sound, especially as applied to the location of batteries during the war. This was so developed that it was easily possible for the Allies to detect the location of enemy guns by means of work done by the bureau. The speaker had thrown on the screen a representation of what was termed the end of the war where at eleven o'clock on Nov. 11, 1918, the lines, which show the vibration of the guns, appeared dis-



The Forging Press in the Metallurgical Building of the Bureau of Standards

tinctly straight as they are recorded on the apparatus as opposed to the various undulations previous to that hour. The assistance which the bureau gave to the development of the manufacture of American op-



The 16-in. Rolling Mill in the Metallurgical Laboratory of the Bureau of Standards for Use in Industrial Research and at the Disposal of American Steel Companies

tical glass was recounted, as well as the most interesting discovery of a method of casting refractory crucibles or pots from kaolin. The value of this work may be appreciated from the statement that these pots are now being made at a cost of only \$9 each as compared with those that had to be used previously which cost \$55 each.

Dr. Stratton dwelt briefly on the work of the bureau in erecting in its laboratory a small cement mill, by means of which specifications are based upon truth and not upon tradition, as well as the building of a paper mill which had been of invaluable assistance to

the paper industry of the country. Similar work in the rubber industry was also recounted. Of direct interest to the steel industry was the illustration showing a 16-in. rolling mill in the metallurgical department which had been used in various work during the war on the investigation of alloy steels and which is now at the disposal of any American industry desiring to solve rolling mill problems. Of similar interest was the view of a large forging press. Dr. Stratton concluded his remarks with the throwing on the screen of pictures of the various laboratories which have been established as a result of the war.

## The Great Coke Plant at Clairton

FRANK F. MARQUARD, superintendent of the by-product coke plant of the Carnegie Steel Co., Clairton, Pa., presented a paper which, with the aid of motion pictures, gave an excellent idea of the immense size of the plant at Clairton and the methods pursued there, from the river transportation of coal to the plant to the shipment of coke and the numerous by-products.

Mr. Marquard began by saying that the Clairton plant stands to-day as the climax in the development of the by-product coke oven industry of the world, being the most comprehensive in plan of operation, largest in size and in detail of construction the most complete. Preliminary to entering upon a description of the plant, he said:

### By-Product vs. Beehive

The delayed recognition, however, of the merits of the by-product coke oven industry has resulted in enormous waste. In the past twenty-five years, in this country, the beehive ovens have wasted in tar and gas, reduced to coal equivalent, an amount equal to over 300,000,000 tons of coal, and a waste of over \$400,000,000 worth of ammonia, and over \$500,000,000 worth of benzol products, these conservative amounts being based in each case on sub-normal prices.

In the past few years there has been a wonderful awakening. The construction of by-product ovens has been greatly extended. Their merit as an essential industry in time of war, as well as peace, is now recognized by our Government as of national interest, as well as of economic interest in the development of

the iron and steel industry, Mr. Marquard declared.

In the year 1918 60,000,000 tons of coke were produced in this country—30,000,000 by the by-product ovens and 30,000,000 by the beehive ovens; and this year, 1919, will mark the turning point in favor of the production of by-product coke.

At Clairton there are 12 batteries, embracing 768 ovens, with a coal consumption of 12,500 net tons each 24 hr. To handle the large quantities of coal required a river fleet of 120 barges and 7 tow-boats was constructed, these plying the Monongahela River. The following table will convey an idea of the scale on which operations are conducted:

### Daily Production and Yield from 12,500 N. T. Klondike (Fayette County) Coal per 24 Hr.

Daily Production	Per Cent Yield— Based on Coal Charged
8,000 net tons of dry screened furnace coke (2½ per cent H <sub>2</sub> O) .....	62 per cent
520 net tons small size coke (domestic coke) ....	4.2 per cent
900 net tons coke dust.....	7.2 per cent
150,000 gal. coal tar.....	12 gal. per net ton coal
162 net tons sulphate of ammonia .....	25 lb. per net ton coal
29,000 gal. pure benzol.....	2.3 gal. per net ton coal
7,400 gal. pure toluol .....	0.57 gal. per net ton coal
2,800 gal. crude light solvents	0.22 gal. per net ton coal
1,400 gal. crude heavy solvents .....	0.11 gal. per net ton coal
75,000,000 cu. ft. surplus gas (575 B.t.u.) .....	6000 cu. ft. per net ton coal

Of the equipment throughout the plant a detailed

resume was given with dimensions and capacities. The speaker mentioned the housing operations of the company, some 500 houses having been built for employees;

while sewage, drinking water, telephone, sanitary and other systems had been created at great expense. A river wall of concrete, 3250 ft. long has been built.

## Non-Metallic Impurities in Steel

BY HENRY D. HIBBARD\*

THE subject of this paper is now attracting attention of steel metallurgists everywhere because of its bearing on the properties of steels, particularly of those of high quality made for lines of service in which the stresses to be withstood are transverse or tangential as well as longitudinal, such as guns and cylinders for high pressures. Only simple or so-called carbon steels are herein considered. The National Research Council has instituted a committee on the elimination of sonims in steel, of which the writer is chairman, and a number of lines of experiment and observation have already been pointed out to steel makers for them to follow up.

"Sonim" is an abbreviation for "solid nonmetallic impurities." Other names which have been applied to sonims or some of them are: Oxidation products, occluded slag, entrained slag, non-metallic impurities, enclosures, entrained silicates, green markings, mechanically held impurities, and recently and more generally "inclusions," but all fall short of the full requirements of a short distinctive name, so the one devised and

finished steel shows a quality which is determined for the most part by its history before teeming, and is not changed greatly by the access of air to it as it passes from the ladle to mold.

In unfinished steel such as the metal of the open-hearth bath, are probably in solution, iron sulphide ( $\text{FeS}$ ) and ferrous oxide ( $\text{FeO}$ ), and in suspension the insoluble and infusible sonims silica ( $\text{SiO}_2$ ) and magnetic oxide of iron ( $\text{Fe}_3\text{O}_4$ ). The iron sulphide was in the stock or formed by the absorption of the sulphur from the fuel. The iron oxides were absorbed from those formed by oxidation of the charge in melting as well as those added to the bath in the form of ore. The silica was formed by the oxidation of silicon in the pig iron or other silicon-bearing material in the charge.

When drillings of metal from an unfinished decarburized open-hearth charge are being dissolved in 1.2 sp. gr. nitric acid close observation will discover streams of minute black particles separating from the dissolving metal. After noting them through a long series of observations in which charges known to be over-oxidized

Fig. 1 Shows a Large Sonim Globule About 0.02 In. in Diameter

Fig. 2 Shows Several Which Were But 0.01 In. or 0.02 In. Apart

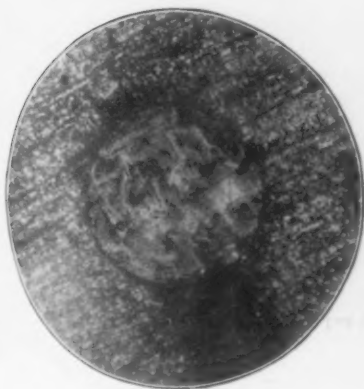


Fig. 3 (Center) Shows a Quarter Section of the Ingot in Which 1,053 Sonims Were Counted, Ranging from 0.01 In. to 0.03 In. in Diameter



used here may be justified. The name "insolubles" would have served fairly well had it been applied when the subject was new.

### Occurrence and Composition

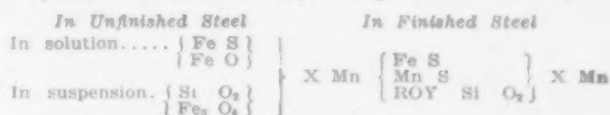
Sonims are liable to be particularly plentiful in Bessemer and open-hearth steels and therefore for the best steels to be made by either of these processes special methods must be employed to clean the steel of them. Crucible and electric steels are less liable to contain many of them. Sonims in finished steel may be classified under the following five cases:

1. The products from the reactions of the manganese and other additions with the sulphides and oxides of the unfinished steel. This is the principal source of sonims.
2. The products from the oxidation of some of the finished steel ingredients by atmospheric oxygen during the progress of the steel from the furnace to solidification in the molds.
3. Oxides from the unfinished steel.
4. Slag particles entrained particularly from the intimate mixing which results from pouring the charge into the ladle.
5. Particles of dirt and other non-metallic matter such as silica and clay with which the metal comes in contact during its passage from the furnace to the molds and which are too small for gravitation to send to the top.

Oxidation by the air in teeming (Case 2) is not a great source of sonims as is shown by the fact that

showed more of these particles than others the writer came to consider them to be iron oxide ( $\text{Fe}_3\text{O}_4$ ), their quantity in the solution indicating their proportion in the metal.

Other impurities exist, of course, in solution in unfinished steel, but take no part in the formation of sonims. It is the particular province of the added manganese to deal with the four impurities mentioned and cause them to leave the metal as completely as may be. This reaction may be represented as follows:



Some manganese oxide is formed by the added manganese and oxygen in the bath which with  $\text{FeO}$  form the base for the silicates.

The sonims in unfinished steel are mainly oxides, and in finished steels sulphides and silicates. The silicates are practically always fusible at the temperature of molten steel.

Sonims are found sometimes in masses of ounces in weight in the upper central part of large ingots. A boiler plate ingot of effervescing basic open-hearth steel weighing two tons had at the bottom of its pipe (an unusual thing in such steel) a glassy sonim of perhaps a quarter of a pound in weight. It was transparent in thin sections and colorless except for a gray tinge, and

\*The author is a consulting engineer, Plainfield, N. J.

it contained bubbles. Its composition was  $\text{SiO}_2$ , 37.06 per cent;  $\text{FeO}$ , 2.16 per cent;  $\text{Al}_2\text{O}_3$ , 26.0 per cent;  $\text{MnO}$ , 33.17 per cent, and  $\text{CaO}$ , 1.53 per cent. The alumina was from the aluminum added in the ladle to control the effervescence of the steel in the molds. The presence of the pipe indicates that too much aluminum was added as such steel is not desired to pipe.

When steel infested with sonims is cast into an ingot mold the part in contact with the mold and bottom plate or stool is the first to solidify and will have sonim globules about as numerous as the metal has when cast. The sonims rise through the molten metal, the larger ones with more rapid motion until caught and held by the freezing metal. If the steel is but partly killed and has gas holes in the upper part, buttons of sonims are likely to be found within the gas holes large enough to furnish a sample for analysis. In Bessemer rail steel they have been noticed of a greenish yellow color with a shiny surface like glass.

#### Scum on Ingots

On low carbon steel, which is made to effervesce in the molds through the liberation of a myriad of gas bubbles, a slag-like scum, more fusible than the metal, collects during teeming and freezing. This scum from its composition is evidently a collection of the sonims of the steel which have been agglomerated by the stirring action due to the effervescence and have risen to the surface through gravitation. It is perhaps the only considerable quantity of sonims readily obtainable and gives us a starting point in their study. On acid steel the scum is usually olive-green or gray and vitreous, though it may be black and crystalline. On basic steel it is black and crystalline. Table I gives analyses of some of the scums. Most if not all of these samples were vitiated by dirt, clay and refractory materials which got into the molds in various ways and were dissolved in the scum, and consequently the silica and alumina are too high and the other ingredients too low.

Table I—Analysis of Scums from Effervescing Ingot Tops

	Acid Besse- mer pipe steel. First Ingot	Acid open- hearth boiler steel	Basic open- hearth boiler steel	Basic open- hearth boiler steel. Open molds	Basic open- hearth boiler steel	Cov- ered
Fe	....	15.96	15.35	11.65	15.26	16.10
$\text{SiO}_2$	7.95	20.38	17.14	19.70	16.80	24.20
P	0.043	....	0.03	....	0.02	0.02
Mn	38.66	48.50	36.00	40.36	37.57	30.70
$\text{Al}_2\text{O}_3$	....	4.00	15.08	....	3.05	13.50
S	2.51	0.39	....	....	0.06	0.10
Ca O	....	....	....	....	5.04	1.20
Mg O	....	....	....	....	1.80	....
* $\text{TiO}_2$	....	....	....	....	5.50	0.60

\*This  $\text{TiO}_2$  came from the addition of  $2\frac{1}{2}$  lb. of ferro-titanium to the ton of steel.

That the scum comes chiefly from the metal (Case 1) and is not made to a large extent by the oxygen of the air uniting with the molten metal (Case 2) has been proven by experiments in which the circulation of the air in the mold has been prevented by covers, the quantity and composition of the scum being but moderately changed by the free access of air during teeming and freezing. The air in the molds was displaced by gas from the metal, which escaped and burned around the edges of the covers.

#### Sonims in Bessemer Process

Bessemer steel as usually made and cast into ingots for rolling is likely to contain myriads of sonims usually of globular form. Acid Bessemer rail steel ingots cut up into slices for examination at Watertown Arsenal some years ago showed uncountable myriads of sonim globules within one inch of the bottom of the ingot while 6 in. from the bottom where the steel had remained liquid about 15 min. longer they were not over one-fifth as numerous. The remaining globules in the central portions of the ingot of which many hundreds were counted on a quarter section of the ingot carried in diameter from 0.03 in. down. The larger of these at

least were on their way to the top when caught and held by the freezing metal.

One Bessemer rail plant improved the quality of its rails greatly by adding molten spiegel to the blown charge in the converter and holding for  $2\frac{1}{2}$  min. when it was poured into the ladle and then teemed.

Acid Bessemer steel for castings may, however, be treated so as to contain but a moderate number of sonims. It may be blown hotter and then held in the ladle after the final additions so that the great bulk of the sonims will escape to the slag. Another way which has been found efficient in making castings: Make the final additions in the converter, and hold it there before pouring it into the ladle, the length of time varying with the size of the heat.

#### Sonims in Acid and Basic Open-Hearth Steel

In this process a cold charge when first melted will contain the usual oxides of unfinished steel and will have a slag which contains oxide of iron uncombined with silica, which oxide reacts with the carbon of the metal, forming carbonic oxide. The slag, however, through loss of this oxide of iron and the addition of silica from the bottom, steadily becomes more acid and its power to oxidize the carbon diminishes in proportion as seen by the gradual lessening of the boil in vigor. Fresh additions of ore are required if more carbon must be eliminated from the metal.

The acid slag absorbs the oxides it touches and thereby favors the elimination of sonims and the charge may be held indefinitely to allow the oxides of iron and silicon in the metal to be taken up by it or the oxides of iron to be reduced in part at least by the carbon present. When the carbon is high as in spring steel the metal may be cleaned of iron oxides almost completely in time. Whether or not suspended silica is reduced by the same treatment is unknown, but probably it is as some observers have found unfinished acid steel to take up silicon when held in the furnace, resembling in that feature crucible steel, though, to a lesser degree.

The residual manganese until all oxidized, as it sometimes is, keeps eliminating oxides from the unfinished steel as previously stated, but no manganese is reduced from the slag (so far as the writer has found) which might keep up the purifying action, though, of course, it can be added from time to time when an exceptionally pure steel is desired.

In the basic open-hearth process the slag always contains free oxide of iron uncombined with silica and this oxide keeps entering the metal either in solution or suspension. The slag also contains free oxide of manganese associated with the oxide of iron which in part accompanies the latter into the metal. These oxides are continually being reduced by the carbon in the metal, the carbon itself being oxidized to carbonic oxide which rises to the surface in bubbles causing the boil. The iron and manganese reduced enter the metal. The more manganese in the slag the better, at least up to 15 or 20 per cent, as the more manganese will enter the metal and flux the oxides of iron and silicon, and so eliminate them, leaving less for the final addition to do. The latter may be proportionately diminished in quantity without injury to the quality of the finished steel.

An addition of ore has greater effect on the charge than in the acid process where a part of the ore is soon combined with silica and only the remainder is useful in oxidizing carbon.

#### Sonims in Crucible Process

The crucible process is particularly favorable for the production of steel free from sonims, to which fact its suitability for cutting tools is no doubt due in part at least. It is an acid process and no oxides are absorbed from the strongly acid slag, but on the contrary the slag sticks to and absorbs any of the oxides which touch it and which might form sonims if left in the steel. Of course, some oxide of iron is adhering to the materials used and some entrained slag exists in the wrought iron of the charge, and these enter the steel as it is melted, but the quantity of steel is small, the distance to be traversed to meet the slag short, and there is

some stirring effected by the bubbling from the escape of the gases before the steel is killed, which brings all parts of the charge into contact with the slag. The time for killing after melting say  $\frac{1}{2}$  to  $\frac{3}{4}$  hr. is ample for those sonims which are not reduced by the carbon to escape. All these conditions favor clean steel with good "body." Hastening the process by adding a gas solvent such as silicon or aluminum to kill the steel is fraught with some risk lest the shortened time be not enough to permit of the escape of the sonims which may be formed and the quality of the steel may then be inferior.

The slag in this process is viscous and tends to cling to the crucible walls when the steel is teemed, and any that accidentally runs into the mold remains usually in masses or globules large enough to rise to the surface before they are caught by freezing of the metal.

#### Sonims in the Electric Process

The electric process of refining steel whether melted elsewhere or not is equally as favorable to the elimination of sonims as the crucible process. The metal may be held indefinitely under a non-oxidizing slag with conditions favoring the reduction of the oxides to the metallic state or their incorporation in the slag and the elimination of the sulphur as calcium sulphide. Hence, the steel if properly treated will as cast be thoroughly cleaned of sonims.

Electric steel is, however, prone to intermix with itself sonims of slag if permitted by allowing the steel and slag to run into the ladle together (Case 3). The strongly basic slag seems to have less surface tension than the strongly acid slag of the crucible and so unable to resist being broken up and intimately mixed with the metal. The sonims formed are retained in the outer parts of the ingots which are first to congeal and there is insufficient time for them to escape.

This trouble is avoided by providing in the furnace spout a brick dam which leaves a hole at the bottom of the spout for the steel to run through while the brick holds back the slag. A combustible plug in the hole holds back the slag until the level of the metal is above the hole. Without this precaution the steel is likely to have sonims near the surface which are exposed by hot working and form defects. In wire-drawing sonims have been found to wear and damage the dies excessively and electric steel was condemned for the purpose until the cause was found and the cure applied.

The sonims of the finished steel when first made are exceedingly minute, and if the steel be cast immediately many of them are likely to be rejected by the freezing metal as it forms grains and be located between the grains where they break the continuity of the metal and form weak surfaces running through the mass. McCance found 90 per cent of the defective steel he has had to do with in the last five years has been due to the presence in the steel of non-metallic inclusions or sonims.

At one rail plant some years ago before the importance of sonims was recognized as fully as to-day, the practice was tried of allowing the steel to stand several minutes to the ladle before teeming, with the result that the percentage of sonims was cut down to a small fraction of what they had previously been. The practice was claimed to interfere with the output, however, and was discontinued.

At another rail plant the practice had been to add the manganese in the furnace before tapping and the failure of a rail in the drop test was a rare thing. The practice was changed to adding manganese in the form of melted spiegel in the ladle with the sequence if not the result that 10 per cent of the rails failed under the same drop test.

#### Elimination of Sonims

To make steel as clean of sonims as practicable the things to be observed are:

1. Have the unfinished steel as free from oxides as possible at the end to diminish the work for the final additions to do and the quantity of sonims to be made, by holding

it without ore additions and with ample carbon and manganese in the bath. The manner and rate of boiling and the fracture of a slag sample will tell the furnaceman how his bath is in this respect. The "boil" must not be vigorous for the percentage of carbon in the metal.

2. Time must be allowed to elapse after the addition of the manganese for the sonims to be precipitated, or changed chemically as already noted, then to collect into globules or drops, and then to float to the top. Probably moderate agitation or stirring helps materially this gathering of sonims into drops of floatable size.

When sulphide sonims touch others of their kind they coalesce, forming larger particles and silicate particles do the same, and with favoring conditions these processes continue until particles or globules are formed large enough to rise.

If the sonims do not coalesce and float it may be that their composition is not right. The basic oxides of iron and manganese by themselves are too infusible to stick together, and so grow and escape. They need combination with silica or some other acid to make them fusible. As sonims are eliminated from steel by their floating up when the heat is held quiet in the ladle there is a nice point involved. If the time has been sufficient to clean the lower layers, then teeming may begin and the rising cloud of sonims will have in addition the duration of teeming in which to reach the top. This may be half an hour or even more in some cases. The proverbial ingot butt which always rolls well illustrates this point, even if its compact does lessen its internal strains and so improves its rolling qualities. At one works making gun steel the charge is held in the furnace 15 min. after the first part of the final manganese is added, and 20 min. in the ladle where it is finished steel.

In steels where the service stresses act in more than one direction as in the guns and cylinders mentioned, the purification from sonims cannot be too complete. So, too in fine cutting tools and in roller bearings where minute sonims in roller or raceway have been found to start, defects which seriously cut down the term of service.

#### Conclusions

To forecast the effect of sonims on the properties of steel there is much work to be done and interpreted, but it may be said that one must know their quantity, composition and manner of distribution or occurrence in the steel. The quantity and composition must be ascertained by chemical means, and the mode of occurrence as far as may be by the microscope.

The experience of McCance and others shows the importance of the subject and the need of further study, investigation and experience to find the answers to the many questions which may arise.

#### Discussion by Frank B. Poto

In several experiments undertaken to determine the source of the ingot scum on bottom cast basic and acid open-hearth ingots, many analyses were made of the ingot scum. In some cases the molds were covered by a plate and in some uncovered. In all analyses the high content of manganese was noticeable, and there was little difference in composition between the ingot scum from the covered and uncovered molds. This should bear out Mr. Hibbard's contention that sonims are mostly the products of the reactions of the manganese with the oxides and sulphides contained in the unfinished steel.

In my experience, the addition of ferromanganese to the furnace bath instead of to the ladle has always been followed by a marked improvement in the quality of the steel, provided the heat was held in the furnace long enough for the purifying reactions of the manganese with the oxides to take place. No doubt this improvement is due largely to a more complete elimination of sonims and sonim-producing compounds, by reduction of the oxides and fluxing of the silicates. That this is largely the case is proved by the great loss of manganese (especially when the ferromanganese is added to the bath) in a poorly worked heat, and by the

comparatively small loss when the heat is properly worked.

As a further means of eliminating sonims, I have in mind a process which is being used to produce a deoxidized basic open-hearth bath. This simply consists in thickening up the slag (starting about an hour before ready to tap) by the gradual addition of burnt dolomite or magnesite. By such a procedure the normal basic slag is diluted by a non-oxidizing base, lime and magnesia, and it soon becomes very viscous. In its struggle to attain fluidity, the slag will seize and hold any fluidity agents, such as the oxides and silicates of the bath. As the metal is covered by a layer of slag, the only source of supply is the bath itself, and it gradually gives up these impurities as the metal comes in contact with the slag.

This viscous slag seems to have a great affinity, probably physical for the oxides and chemical for the silicates. Ferromanganese may be added to a bath treated by such slag, and held 10 to 15 min. before tapping and there will be little loss of manganese. This would largely eliminate the sonims of Mr. Hibbard's Classes 2 and 3.

### Discussion by L. B. Lindemuth\*

There is a factor of this subject which bears more importance than I believe is generally appreciated, and which, to a certain extent, interferes with a scientific analysis of the subject and must be eliminated or reach the irreducible minimum before we can have any assurance whatever that our steel is free from dangerous inclusions. This feature is the introduction of non-metallic impurities from sources foreign to materials entering into the metallurgical reactions. These sources would include brick, silica, sand, ganister, loam, fire clay, furnace bottom material, dirt from the moulds and stools, mould wash or non-metallic ingredients from any other similar source. The composition of such impurities consist of silica, oxides and silicates of aluminum, iron, manganese, lime and magnesia, and all manner of complex silicates of any one or combinations of all. These silicates in turn are capable of combining with sonims produced by reactions in the steel. With such combinations it is difficult, or I might say impossible, to determine which or how much of these non-metallic impurities are produced by materials used for the metallurgical reactions or by materials coming from outside sources.

#### Sources of Outside Materials

A rough average of the life of a ladle lining indicates that the equivalent of 0.3 per cent of the weight of the heat in brick work is removed from the ladle lining each time a heat is tapped into it. For a 100-ton heat 672 lb. of brick work and clay enters into the steel and slag. No doubt a large portion of this enters the slag, but some of it is caught in the steel.

It is the practice in some plants to use sand around the nozzle to prevent a leak while tapping. This sand or a large portion of it, is washed into the first part of the heat while the steel is being poured. The nozzle and sleeve bricks wear away appreciably, both by fusion and abrasion. Where steel is poured through boxes or tun dishes the same action of fusion and abrasion takes place with the lining and nozzles of the boxes. As slag is not present in the box, it necessarily follows that the brick and clay enter the moulds with the steel. Similarly, in bottom pouring, where steel passes through firebrick runners and enters the bottom of the moulds, the runners are fused or abraded and the particles of fused clay must pass into the mould. The advantage of good surface conditions gained by this method of pouring is possibly offset by the liability of a greater number of inclusions, particularly where comparatively long ingots are cast. Some plants, in bottom pouring, have produced steel for ordnance exceptionally free from sonims by the proper selection of runner bricks, careful temperature control, rate of pouring and possibly by a mould designed to prevent

corner weaknesses which are sometimes associated with sonims, and by a comparatively short ingot. The advisability of top or bottom pouring, and the conditions which would require one or the other for producing steel more free from sonims is still undetermined.

It is common practice in many plants where ingots are top poured to wash the stools with a clay or lime wash. That stools are worn away by the force of metal striking them is further indication that whatever material was used for this wash will, in part, be mixed up with steel in the moulds. It is further common practice to wash moulds with a mixture of graphite and water or graphite and molasses or tar, or some other binding substances. The graphite commonly employed contains about 50 per cent ash, which is an iron aluminum silicate. When fused under reducing or neutral conditions this ash is green and crystalline similar to inclusions which I have often seen, and its position in the moulds is particularly favorable for its entanglement near the surface of the ingot. Furnace slag may be introduced into the steel by having slag from the previous heat adhering to the sides and bottom of the ladle. The fusion or abrasion of furnace runner brick ganister and clay, and loam if used, in the runners, the abrasion of furnace bottom, particularly where bottoms have been built up from lime and previous slags, rusty moulds and stools, asbestos packing, etc., can be other possible sources for the introduction of oxides and silicates into the steel.

It is generally conceded, and practical results bear out the contention, that in the manufacture of steel an appreciable percentage of residual manganese throughout the making of the heat is of the greatest benefit in reducing sonims.

#### High Temperature Brings Other Evils

If we were to overlook the fact that non-metallic inclusions can occur from the sources outside of the steel, then the general assumption that steel should be poured hot for the elimination of sonims would probably be correct, but the fusion of bricks, abrasion of furnace bottom and cutting of stools, and perhaps moulds, is increased by an increasing temperature so that by choosing conditions which will better one side of the equation we have produced an effect which increases the tendency for inclusions from another source. It might be of advantage to have the steel in the furnace at some stage of the process, above normal temperature, but allow it to cool in the furnace before tapping.

Outside of the question of inclusions the question of pouring steel at a temperature above normal increases the difficulties encountered from crystallization known under the general term of ingotism. To recommend pouring at higher temperatures, without the knowledge of the proportion of sonims introduced from outside sources, and without considering ingotism, might lead to the elimination of one class of impurities, but reduce the quality of the steel by introducing other defects just as harmful. I think it will be conceded that generally the best results are obtained by pouring steel on the cool side rather than the reverse.

Fused fire brick or fire clay and unfused grains of silica sand are trapped and held in steel even under conditions which we would think would be most favorable to their floating to the top, namely, in skulls from the bottom of ladles. Here solidification takes place slowly compared to solidification in moulds, but I have seen in many of these ladle skulls, several inches from the surface, grains of unfused sand, light bottle green slags, transparent amber color slags, dark green opaque slags, and portions of fused bricks from the ladle lining either embedded in the solid steel or entangled in fir-tree crystals. The flash or fir from the bottom of an ingot which freezes instantly often shows an inclusion of fused material of considerable size.

#### Analyses of Acid Open-Hearth Slag

In another investigation I had analyzed, from ingots of acid open-hearth gun steel, slags which collected on the outside surface of ingots about one-third the distance from the bottom and also, from the same

\*Carney & Lindemuth, consulting engineers, New York.

ingots, slag which had collected on the top. The average of these slags analyzed as follows:

Color	Slag One-third from Bottom: Dark Greenish, Transparent	Slag from Top Surface: Bottle Green, Transparent
	Per Cent	Per Cent
SiO <sub>2</sub> .....	56.38	49.35
FeO .....	6.78	4.75
MnO .....	17.72	29.59
Al <sub>2</sub> O <sub>3</sub> .....	15.33	12.89
CaO .....	1.39	0.89
MgO .....	1.90	2.28

To these heats no aluminum was added either in the ladle or moulds. The increase in manganese oxide from 17.72 per cent to 29.59 per cent substantiates the statement that silicates will react with the manganese of the steel, and the alumina indicates that these slags were of clay origin. I am unable to account for the presence of lime and magnesia unless it could come from slag left in a ladle which had previously been used for basic steel. In other cases of large forging ingots from 30 to 40 in. in diameter, grains of sand, bottle green, transparent inclusions and blue green aluminum silicates have been encountered in comparatively large sizes, 8 to 10 in. from the surface of the ingot, and located anywhere in the bottom half.

#### Value of Agitation Questionable

Whether or not agitation of the metal helps remove sonims is problematical. It is reasonable to expect that if we find inclusions in all parts of ingots of a size visible to the naked eye, which should be the ones most likely to float to the top, microscopic inclusions and those of molecular size can exist to an even greater extent under the same conditions. If such is the case agitation such as occurs in "rimmed" steel, or as designated by Mr. Hibbard, "effervescing" steel, would tend to keep these small particles in circulation and therefore prevent their rising to the surface. It is also questionable whether quiet or dead steel solidifies more quickly than rimmed steel. Our knowledge on the subject would indicate that rimmed steel would solidify more quickly than dead steel and that solidification takes place very rapidly after the rimming has ceased. If such is the case the sonims which have been circulating by the rimming action would be more quickly caught in the freezing steel than if the steel had quietly solidified. There has recently come to my attention hundreds of tons of soft basic open-hearth rimmed steel, bottom poured, which contained enormous quantities of inclusions of large sizes analyzing from 52 to 60 per cent SiO<sub>2</sub>, 5 to 7 per cent FeO, 2 to 7 per cent MnO and over 20 per cent Al<sub>2</sub>O<sub>3</sub>. Some of these inclusions showed the unaltered structure of fused fire brick or clay. On the other hand, in the case of dead steel the growth of the fir-tree crystals would tend to catch such particles as would ordinarily rise to the surface if their progress were uninterrupted. These fir-tree crystals, sometimes 12 in. or more in length, extend into the molten steel and undoubtedly form a serious obstacle to the floating of sonims. The corners of ingots afford numerous examples of non-metallic particles being so entrapped.

#### Scum on Rimmed and Dead Steel

Mr. Hibbard's statement that scum collects on the top of "rimmed" steel, but does not collect on the top of dead steel does not always hold true. Manufacturers of rails and other dead steels, whose practice is to make ingots with convex tops, realize that this cannot be accomplished unless particles of slag or scum which have collected on the top are immediately removed. It is true that in many cases this scum does not appear on the top surface of the ingot when making dead steel, but it is almost invariably found in the pipe cavity.

Whether or not there is a larger collection of sonims on the top of rimmed steel or dead steel is very questionable, although from general observation I would say that the quantity of scum visible on the top of rimmed steel is greater than that which is encountered in the pipe cavity and on the top of dead steel.

The crucible process is usually credited with producing steel freer from sonims than any other process, but

if we were to cast an ingot of say 30 in. in diameter from crucible steel at the same temperature and under the same conditions as open-hearth steel, I am not sure but that sonims would be as numerous as are sometimes found in steel made by other processes.

If it is possible to reduce sonims to a minimum by furnace practice, would not the investigations of Mr. Hibbard and Dr. Andrew McCance indicate that the processes most suitable for the elimination of sonims, not considering the crucible process, are the duplex processes using a basic open-hearth furnace and electric, using duplex metal or a charge of 100 per cent scrap? If in the duplex process, using a basic open-hearth furnace the steel were treated with sufficient manganese to maintain in the charge at all times an appreciable percentage, say 0.25 per cent manganese, the sonims should be in a condition to float most readily, the quantity being small on account of the absence of silica or silicon and the distance for the sonims to float to the top being at a maximum 30 in. The same conditions would exist in an electric furnace where pig iron was not used in the charge and hence no silicon introduced.

It is almost universal practice to use in ladle linings and runners, bricks of third quality with regard to fusion temperature. Such bricks are dense and become vitrified, and therefore make easy the removal of steel skulls and scrap from the ladles and runners. First quality fire clay bricks steam-pressed have a density probably equal to those of third quality bricks, and it might therefore be advantageous to line ladles and runners with first quality bricks using a clay bond of equal quality.

#### Cost of Steel Enters Question

G. L. Kelley of the Midvale Steel Co. said that nearly all would agree in the main with the statements in Mr. Hibbard's paper. He also said:

"The cost of steel will often determine the amount of effort which can be put forth by the manufacturer. Low-price steel must of necessity be manufactured without too great elaboration of the processes, and, accordingly, it will contain larger amounts of these objectionable impurities. With higher grade steels, where the increase in cost incident to greater care in manufacture is not a too serious obstacle, all possible precautions must be observed. These precautions in open-hearth furnaces will of necessity lead to the selection of acid furnaces in preference to basic."

#### Discussion by Dr. John A. Mathews\*

Dr. John A. Mathews briefly commented on Mr. Hibbard's paper, beginning by saying that credit was due Mr. Hibbard for devising such a comprehensive name as sonims, covering as it does "a multitude of faults that steel is heir to."

In part, Dr. Mathews said:

"The Committee on Aircraft Engine Forgings, of which I was chairman, came to the conclusion that so-called 'hair lines' were due to sonims, elongated in the direction of rolling or forging. They varied much in length and visibility. Sometimes they were seen only on the ground and polished surface with a magnifying glass. Actual grinding tests and count of hair lines on cylindrical surfaces of chrome nickel steels of the type represented by 3.5 per cent nickel, 0.75 per cent chromium and 0.35 per cent carbon were made. Steels to the same specification were made in the basic open-hearth, acid open-hearth and basic electric furnace. The relative average count was respectively 46, 23 and 6, and it was further noted that the hair lines were in general, much shorter and inconspicuous in the electric product than in either class of open-hearth products.

"We produced many heats of this analysis that were entirely free from the defect. However, in our report to the Aircraft Production Board, we stated that, in our judgment, it was not possible to guarantee any steel perfectly free from them. They might be so infrequent and inconspicuous as to escape detection in individual inspections. In these inspections a cylinder was subjected to from six to ten grindings, and the general

\*President, Halcomb Steel Co., Syracuse, N. Y.

experience was that the hair lines were most numerous near the surface and tended to decrease or even disappear, even in fairly dirty steel after six or more grindings. This would seem to confirm Mr. Hibbard's idea that these represent the sonims entrapped upon

first cooling in contact with the mold. The center of the ingot remained liquid long enough for many of them to escape. The grinding operations were not continued long enough to show whether they recurred at or near the center zone of the cylinder."

## Charging Raw Material Into Blast Furnaces

BY J. A. MOHR\*

SO long as raw materials maintained their early qualities of purity and excellence the question of methods of charging was not of such great importance. Later, however, next to the quality of the raw materials themselves, no more important developments in blast furnace design and operation were found than those dealing with the proper methods of charging raw materials. The approximate quantities used per ton of iron produced are 4300 lb. ore; 2000 lb. coke; 1000 lb. limestone, and 7800 lb. air, when smelting Mesaba ores.

### Method of Charging Air

No other raw material has so little variance in the method of charging. Air supplied may vary in uniformity, due to temperature, moisture, and atmospheric pressure. Many blast furnace managers have found it to be of advantage to adjust the quantity of air supplied according to the existing conditions of temperature and pressure. This is done by adjusting the revolutions with the existing atmospheric conditions of temperature and barometric pressure, so that the actual pounds of air delivered to the furnace will remain constant. Efforts have also been made to eliminate the irregular flow of air as received from reciprocating blowers, by the use of turbo blowers. No general sentiment favors the turbo blower at present; however, the uniform supply of air which they seek to attain is of importance, and their practicability as a blower should receive the attention of every operator.

The moisture in the air varies during the year as high as ten grains per cubic foot, several different methods having been devised to eliminate this variation. These methods may be divided into three general classes—the dry cold, chemical, and those resorting to the use of cooling liquid in direct contact with the air.

There is still another method of eliminating the variable amount of moisture in the air by adding steam to the air in the cold blast main in such quantities as to produce a moisture content in all cases close to the maximum amount that may be expected under weather conditions existing at the particular location. While this method does effect a uniformity in the condition of the air, it is hardly likely that much good is accomplished by introducing a uniform condition which is undoubtedly uniformly bad.

While the elimination of the moisture content of the air is of great benefit to the furnace, the methods so far devised are so costly in installation and operation that but few plants have adopted them. The composition of the air has received a great deal of attention, from a theoretical standpoint only, in consideration of the inert nitrogen content. Elimination of nitrogen, partially or otherwise, would decrease greatly the amount of work done by the blowing engines; it would also lessen the amount of heat required from the stoves; would intensify reactions in the furnace hearth; reduce the amount of flue dust produced by reducing the volume, and, therefore, the velocity, of the gases passing out of the furnace; increase the flame temperature of the gas, and decrease the amount of heat carried away by the stack gases of the stoves and boilers. However, while the nitrogen has been separated from the oxygen of the air in comparatively small quantities, the utilization of any present methods for the large volume of air required in furnace work is commercially impossible, and much remains for the scientist to accomplish before any of its benefits can be acquired by the operator.

The hot blast main and bustle pipe should be so designed and arranged as to insure a good distribution of air to the several tuyeres. A necessity to accom-

plish this is the use of clean gas, as dirty gas accumulates dust in the stove, which is carried over and deposited in the bustle pipe, obstructing the uniform flow of the air. It seems probable that the proper method of distributing the air evenly is to so arrange the raw materials in the top of the furnace as to produce an equal resistance in front of all tuyeres upon their arrival in the hearth. To my knowledge, very little research has been done along these lines, but I hope these conditions will be investigated by the different operators, and some more definite conclusions arrived at which will be of value in eliminating a condition of irregularity that is not equalled in any of the other phases of charging.

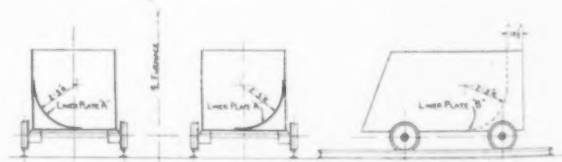
### Charging of Iron Bearing Materials, Flux and Fuel

The charging of these raw materials presents a rather complex problem, the importance of which cannot be overestimated, and is more complex and more important, the less uniform, the less regular, and the less desirable from any point of view, within physical or chemical composition, these materials are, as such irregularities can, to some extent, be compensated for or counterbalanced through attention to the various details of the method of charging, both in engineering and in operating.

The methods in use by the United States Steel Corporation at the ore mines and docks in grading and mixing the ore are of great value to the furnace operator, and minimize to a great extent the troubles of the operator in this respect. At the mines each car is analyzed before sending to the docks. At the docks the car loads are then distributed to the various bins, according to their analysis. Then the different car loads in the bins are thoroughly mixed in the process of handling into the boats, then to the receiving docks at the lower lakes, and lastly to the cars for their transportation to the furnaces. This method produces grades of ore which are remarkable in the uniformity of their analysis, and invaluable to the furnace operator, producing a regularity of raw material which he could not hope to attain without such thorough dissemination of grades as they are shipped from the mines. The average furnace plant uses several different kinds of ores in its furnaces, and the method of stocking these in the yard should be an object of careful study to the operator.

### Bins—Ore, Flux and Fuel

There are many types of bins in use at the present time, the most common being the Brown, Hoover & Mason, Wellman-Seaver-Morgan, and the Baker. Most

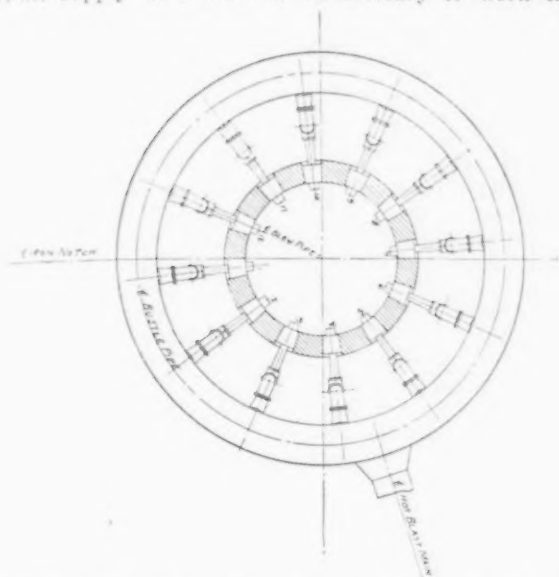


Arrangement of Skip Cars Showing Liner Plates A and B

bins are equipped with mechanically operated doors, both steam and electrical operation. Some modern bins, however, still use hand operated doors. These bins have all been designed to eliminate as much as possible the sticking and arching of the ores in them. However, it is a difficult proposition to do this, and there is no ore bin, to my knowledge, which does not have to be dug out when it is necessary to utilize its full capacity, and in most plants constant attention must be given to the bin to insure that each door will be covered with ore, especially when weather conditions

\*The author is superintendent Carrie furnaces, Carnegie Steel Co., Rankin, Pa.

are bad. The bins should be of ample capacity to supply the furnace for a considerable period in case of a breakdown on the ore bridge, and for reasons of economy the capacity should be sufficient to hold a 24-hr. supply so it will be unnecessary to work the



Arrangement of Hot Blast Main, Bustle Pipe and Blow Pipes, Furnace No. 4

ore bridges at night. They should be located in relation to the furnaces so that the larrys will have the least possible length of travel.

Coke bins are generally separate from the ore bins, as there are different requirements necessary for their operation. Coke will travel freely over a much flatter slope than that necessary for the ore, so that the bins can be made comparatively flat and shallow. The importance of screening the coke thoroughly cannot be overestimated, and the bin should be so arranged as to allow for extensive and well designed screens. Besides the bad influence of coke dust on furnace operation, due to its small size, it is much higher in ash and lower in fixed carbon than the average size coke. Comparative analyses taken of the coke dust and coke at Carrie furnaces show a percentage of 21.5 ash and 74.26 per cent fixed carbon in the coke dust as against 11.83 per cent ash and 83.26 per cent fixed carbon in the average coke. Much careful experimenting is required to find out just where to stop with the screening of the coke so as not to waste pieces of coke that are all right, and at the same time to remove the dust that would be injurious to the furnace. We made an experiment some time ago to determine, if possible, the injurious effect of small pieces of coke on the furnace operation. We screened the coke over plate screens with  $1\frac{1}{4}$ -in. diameter holes, and then re-screened, by hand, the resulting breeze over  $\frac{3}{4}$ -in. screens to remove the smaller particles. The breeze recovered was then charged into the furnace by partly filling the skip with the breeze and then adding the regular run of coke out of the bin. We started with a mixture of 16 per cent breeze and 84 per cent regular coke, and increased the breeze to 25 per cent of the charge. We continued with this amount on the furnace for four days, stopping at the end of that time because of the inability to keep up the supply of hand screened coke. The furnace showed good effects, became hot, and later carried an increased burden of about 7 per cent without any appearance of becoming cold. This experiment, while not extending over a very long period, satisfied me that much coke that is screened out could be used in the furnace without causing any harm, thus effecting considerable economy.

We use the volume method of measuring coke at Carrie furnaces, the arrangement of our coke bins being such that weighing coke in the larry car is impossible. When measuring different kinds of coke by the volume method, the weight of coke per skip will vary considerably, unless, as stated before, the bin is of such design as to mix the contents of the several cars

in it, which will average the different cokes and probably produce as accurate results as the weighing method, which introduces the error of weighing moisture, a variable ranging from 1 per cent to 10 per cent. The volume method has additional advantages in that it gives a constant volume of coke to the round, which helps to stabilize distribution conditions, and in case small dirty coke is encountered, tends to counteract the result by an increase in weight for the same volume. Also, considerable extra labor is required to handle the coke through the larry cars, and additional expense is sometimes incurred in charging the materials by the necessity of using a separable larry car for the coke when weighed.

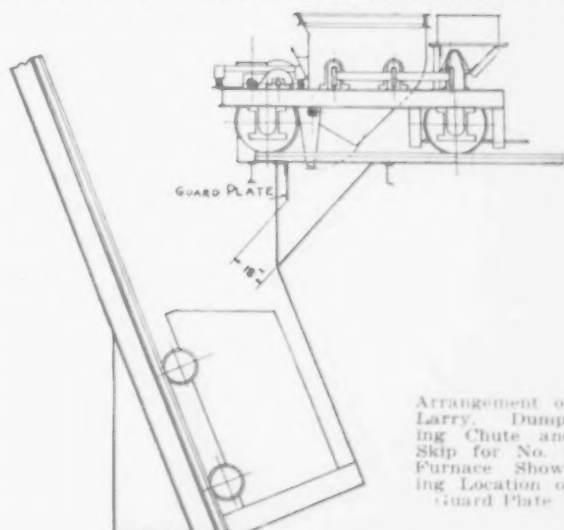
Under the present conditions, the operator in the Pittsburgh district has to contend with coke from 14 to 20 different mines and ovens, some of the coke hand drawn and some machine drawn. These conditions produce considerable variation in the weight of coke per unit volume, and militate against the measuring by volume method.

#### Larry Cars

One of the most important phases of the charging of raw materials is to properly weigh the several kinds of ore bearing materials and the flux in the larry cars before dumping into the skips, and also to so arrange the several materials that there will be a uniformity in their mixture which will be retained through the successive steps subsequent to their delivery in the furnaces, especially in regard to the prevention of the segregation of lumps. As stated before, the arrangement of larry car and bin should be such as to enable the larryman to readily remove any excess amount of material. This is a most important feature.

#### Skip Cars

Skip cars may contribute considerably to the effort to gain uniformity in the arrangement of the materials in the furnace. In order to further prevent lumps from segregating and insure good distribution, each individual operator must carefully determine the proper location of skip while dumping, the angle of tilt necessary, and the speed of dumping, which will best suit his conditions. The skip should be designed to prevent ore sticking in it, and should be so constructed that in case,



Arrangement of Larry, Dumping Chute and Skip for No. 5 Furnace Showing Location of Guard Plate

with the volume method, of charging coke, it is wished to change the coke unit, the alteration will be simple to make.

#### Distributing Machinery on the Furnace Top

The first mechanical system of charging, excepting the Neeland type, gave but little consideration to the proper distribution of materials. Later, however, the importance of this feature was realized, and many methods have since been devised to produce an equal distribution of the materials in the furnace. These may be divided into two classes—the stationary and the revolving top. We use the stationary top on all our furnaces. The dumping rail of the skip incline

swings in a radius about the center of the front wheel on the skip, allowing the skip nose to remain in the same location while dumping, which we believe insures better distribution of lumps and fines; also the skip nose is held back from the center line of furnace and allows the material to fall more nearly along that line.

The modern revolving tops have proven satisfactory at a number of plants. However, I would not recommend that type of revolving top which is so designed that the distribution in the receiving hopper neck is admittedly uneven to begin with, and which seeks to eliminate this unevenness by rotating and discharging each skip load a fixed number of degrees in advance of the preceding one, but rather would prefer a type giving fairly good distribution even in case it was not rotated. Such a type would, in my judgment, be much better, as the unequal distribution of the stock would be much less to begin with, and it therefore would have considerably more chance of attaining good distribution.

One of the most important improvements to the distributing machinery in recent years has been the electrical operation of the bells in conjunction with the skip hoist. Cables run from the bell levers to the hoist house where the electrical mechanism is generally installed, and the bells are operated by means of these cables. The controls of the skips and bells are interlocking, and the bells can be made to operate in a predetermined sequence with the skips. By this means, a check is had upon the correct sequence of each charge; also the bells open at a fixed rate of speed, which cannot be obtained with steam cylinder operation. Another good feature of this method is the elimination of the possibility of having the small bell left open when the skip dumps, or prematurely opening the small bell, which would allow the materials to run out of the hopper neck on one side of the bell and thus be distributed very unevenly on the main bell.

We do not have electrically operated bells at Carrie furnaces, but have installed a magnet at the lever of the small bell operating valve which prevents this lever being operated until the skip has been dumped, thereby eliminating one of the undesirable features of steam-operated bells.

#### Conclusions

Throughout this paper I have eliminated, as much as possible, detailed descriptions of the different mechanical apparatus used in the charging of raw materials, but rather have tried to indicate the various conditions which must be met by the operator in the handling of the present day raw materials, so as to utilize the existing apparatus to full advantage, because it is my belief that any of the modern apparatus in general use will meet the requirements of the operator satisfactorily if he co-ordinates and arranges the different phases of the charging and mixing of the raw materials so that in their final delivery to the furnace he has achieved the uniformity in their disposition and arrangement that will best suit the various conditions at his individual plant.

Organization and human influence plays a strong part in the results obtained by the operator—the different departments must fit well together so that the work performed by them will be a steady evolution of his ideas; the individual must be taught so that he understands the importance of his task, and realizes the results that will be gained through its proper performance, and incentive must be given the individuals to so perform this work at all times in such a manner that will be conducive to the general good of the men, the plant, and the management.

#### Discussion by R. W. H. Atcherson\*

The true value of Mr. Mohr's paper can only be appreciated by those blast-furnace operators who are expected to produce good pig iron from inferior and irregular raw materials. Remarkable blast-furnace results have been attained on stationary top furnaces proving satisfactory distribution for the grade of raw materials used. If their raw materials had been of less

excellent quality the need for rotating the top might easily have become a serious factor.

The rotating tops have given excellent results on the Inland Steel Co. blast furnaces. During the present business depression No. 2 furnace was blown-out after producing 1,041,970 tons of iron at a daily average of 525 tons and coke practice of 1881 lb. This is not claimed to be a phenomenal record but we were surprised to find that the hearth, bosh and practically all of the stack lining had been worn back very uniformly about five inches.

This furnace had no cooling plates above the bosh. Originally the cast steel T section wearing plates for protecting the stock line only extended 9 ft. 4 in. below the closed bell. We have put in additional castings protecting the brickwork to 12 ft. below the closed bell or 8 ft. below the stock level. All of our furnaces have the same cycle of filling.

The blast furnaces at several plants in the Chicago district are producing unusually good tonnages and fuel practice. The sequence of filling is not the same at any two of these plants and yet every one of them mix the ore, coke and limestone by dropping them off the large bell together, while the maximum coke mass used is 9,200 lb.

The successful operation of a blast furnace, especially the life of the lining depends so much on the regular descent of the column of raw materials and the removal of incipient scaffolds that I believe some reference should be made to the frequent use of scouring or corrective charges of highly siliceous materials.

We recently had an interesting example of the profound effect a change of filling can produce on the internal condition of a blast furnace. Our No. 1 furnace had produced 700,000 tons of iron since being partially relined. The bosh angle is only 77½ deg. so that we no longer had a furnace that could be changed readily between radically different grades of product. A couple of months ago we changed from basic iron to high silicon foundry, filling a number of orders above 5 per cent silicon. Considering all operating conditions, the results on foundry grades were creditable. Orders were finally received to put the furnace back on basic iron, the usual methods were employed for changing the product but the furnace would not respond to any of the changes sufficiently to operate normally on low silicon, low sulphur iron. All the scouring methods used for cleaning out a furnace were employed, even including fluorspar. The burden was varied widely in amount and composition. The slag was altered through a range from very fluid to viscous slags. Every practical combination of tuyere size, wind volume and blast temperature were resorted to and yet the furnace would not operate regularly except when we swung over to foundry grades. Finally various standard methods of filling were tried with indifferent results, until we experimented with a more thoroughly mixed charge than I had ever before had occasion to use. The results obtained by the present method of filling have been of such value to us that I believe other blast furnace operators would be benefited by adopting a similar change in their filling, in case they should ever be unfortunate enough to drop into so deep a rut. The following rather peculiar sequence of furnace charging constitutes three of our standard charges:

Ore .....12,000	} Dump large bell	Stone ..... 5,700	} Dump large bell
Coke ..... 3,700		Coke ..... 3,700	
Stone ..... 5,700		Ore .....12,000	
Coke ..... 3,700		Coke ..... 3,700	
Ore .....12,000	} Dump large bell	Ore .....12,000	} Dump large bell
Coke ..... 3,700		Coke ..... 3,700	
Ore .....12,000		Stone ..... 5,700	
Coke ..... 3,700		Coke ..... 3,700	
		Ore .....12,000	
		Coke ..... 3,700	

In this case, where the furnace worked well on foundry iron and miserably on basic iron, it would appear as though we were unable to shift the fusion zone limits without scaffolding the furnace until we thoroughly mixed our charge.

I would like to add to Mr. Mohr's testimony that I have seen mixed filling substituted for stratified filling at a number of blast-furnace plants using Mesaba ores, with beneficial results in every instance. The gaseous

\*Blast-furnace superintendent Inland Steel Co., Indiana Harbor, Ind.

current or indirect reducing agent of the furnace physically as well as chemically seeks the particle of ore which it is destined to reduce and it is only by the proper mechanical preparation of the charge that the intimacy of contact is afforded to produce the most efficient blast furnace practice.

### Discussion by Harry S. Braman\*

The air supply of our four furnaces at East Youngstown is furnished by four horizontal Tod engines and one turbo blower. As the outside air is freer from moisture and other impurities than the air found in the engine house, the intake was placed outside. Until recently the air intake was a general intake for all furnaces. However, we noticed with this arrangement that the engine on the end of the line was apparently receiving under the same conditions a better supply of air. In other words, the engine nearest the intake seemed to be robbed of its full air supply. A series of experiments were conducted to determine what discrepancies might exist. These experiments plainly indicated that our No. 1 furnace engine was receiving approximately 7 per cent more air than the engine nearest the intake. We give below our actual tonnage and coke consumption on No. 1 and No. 3 furnaces, operating under almost identical conditions for a period of six months. These results seem to verify the experiments and we have accordingly made arrangements to have a separate intake for each engine.

	No. 1 Furnace		No. 3 Furnace	
	Average daily tonnage	Average coke per ton of metal	Average daily tonnage	Average coke per ton of metal
Nov.	584	1999	555	1951
Dec.	607	1976	572	1983
Jan.	594	1925	542	1959
Feb.	589	1839	557	1955
March	609	1696	544	1866
April	571	1816	524	1882
Average	592	1875	549	1933

The Hoover-Mason bin system for the handling of stock has proven very satisfactory. In this system, the coke, ore, limestone and other miscellaneous material are all handled through the larry cars and dumped into a single revolving bucket which in turn carries the material to the top for further distribution. Since accuracy in weight of materials is absolutely essential, we have welded the rails underneath the larry car so as to give very little chance for any variation caused by irregularities in the track. The cars are also equipped with tapes which record the weights of the different materials as they are being drawn into the car. These tapes are taken off each morning and carefully checked.

Although all of our coke is handled through our larry cars and their weights recorded, we much prefer the volume system, and accordingly fill the car level full regardless of the weight. There are good arguments on both sides of this question, but our results have been so much more satisfactory with the volume system that we prefer its adoption.

In our method of filling, we use two buckets of ore, two buckets of coke, and one bucket of limestone, which includes each round, and five of these rounds comprises one grand round, thus giving a uniform mixture of the different percentages. The advantages in this method are many over the old method of weighing each ore in each round, particularly because: First, more accurate weighing due to a larger amount of ore, which will not be affected so materially by slight error in scales; second, fewer trips necessary, less power required, and less wear and tear on the machinery due to fewer stops and starts, and third, a speed in filling.

The dumping of the bell also enters into the careful operation of furnaces, and we find by alternating the periods of lowering that good results are obtainable.

The Neeland top, which was incorporated in the design of our furnaces, has given us excellent dis-

tribution. We have, however, made a few minor changes in the original design and feel that by so doing we have increased the efficiency to some small degree. Just recently we have blown in No. 2 furnace which has been down for relining, and prior to our lighting up, a careful inspection was made of the stock as it lay on the top ready to descend for the process of reduction. Coarse and fine materials were evenly spread about and very little variation in the levels of the stock was noticeable. Barring furnace irregularities which might occur, we feel that the stock placed evenly on the top should descend intact and make for better furnace operation. The water-cooled wearing plates which are in use, are such that they remain unaltered throughout the life of a furnace and are something which can be absolutely depended upon.

### Discussion by R. V. McKay\*

At present time among the four furnace plants of the Bethlehem Steel Co., one is operating practically 100 per cent on Cuban ore, a second exclusively on Lake ores, a third entirely on Cornwall ore, and the fourth mostly on Lake ores, with some New York State and some Cuban ores. With changed after-war conditions, two years from now the ore mixture at all but one of these plants is likely to be radically altered. European, Cuban, Chilean, and New York State ores, with low cost water transportation might easily prove more attractive than Lake ores with their high transportation cost due to long rail haul. With such unsettled conditions to face, the furnace operator becomes deeply appreciative of the importance of the many fine points which Mr. Mohr has brought out.

At none of our furnace plants is any attempt made to use dry blast. The Sparrow's Point furnaces, due to their location on tide water, encounter the worst moisture condition, the moisture for considerable periods in the summer months running 12 to 14 grains per cubic foot.

The majority of the steel plant furnaces of the Bethlehem company use clean gas in the stoves, and, therefore, no difficulty is encountered from the accumulation of dust in the blast mains. In the new furnace construction at Steelton, especial attention was paid to the reduction of friction of the blast passing through the mains by the use of extra large hot and cold blast pipes.

The subject of unequal distribution of blast among the various tuyeres is the source of considerable annoyance at many furnaces. At times we have endeavored to correct such a condition by a change in dimensions of tuyeres, with more or less success. In general, however, better results are obtained from a revision of the filling conditions either as to quality of coke, coarseness of ore, or details of top distribution. With other conditions fairly normal, low grade coke, either extremely dense, or of soft character, is perhaps the chief source from which irregularities of air delivery at tuyeres are derived. Poor coke by causing scaffolding and subsequent bosh slides, or by burning slowly or unevenly, results in some tuyeres delivering more air than others.

As to stationary coke screens, the writer's experience has led to the adoption, as standard, of a cascade type screen made up of short chilled cast-iron segments. These are tapered in two directions, thus giving wedge-shaped openings which never clog up. If pieces of small coke tend to stick between the bars, they are soon forced along to a wider place, where they fall through or proceed down the screen surface.

The practice of charging coke by volume is in general use in all but one plant of the Bethlehem Steel Co. All plants use by-product coke. The extreme difficulty of properly determining coke moisture in order to make corrections if the direct weight method is used, together with the simplicity of volume method, causes general adoption of latter.

The charging of the ores normally available for

\*Superintendent blast furnace and steel department, Youngstown Sheet & Tube Co., Youngstown, Ohio.

\*Superintendent blast furnaces, Bethlehem Steel Co., Bethlehem, Pa.

Eastern furnaces is more or less complex because these ores are so radically different, one from another, either physically or chemically. There is very little difficulty in deriving a well graded ore of uniform analysis from each mining district because most of the ores, aside from Lake ores, are subjected to mechanical treatment, such as crushing, concentrating, nodulizing or sintering, before being further mixed, to a greater or lesser extent, by successive handling in transit to furnaces.

One plant of the Bethlehem company is equipped with the latest style Neeland filling system, a second has McKee top furnaces, a third the Baker-Neuman top somewhat modified and the fourth plant has one furnace using a Roberts top, a second furnace filled by a non-rotating bell bottom dump car, and two others with single skip simple top. Good distribution is obtained in each case, but direct comparisons are difficult.

The writer agrees with Mr. Mohr in his statement that a revolving top furnace, to be entirely satisfactory, should be designed so as to give good distribu-

tion when used without revolving, or as a simple stationary top. This generally means a long receiving throat of small diameter, a small bell of corresponding diameter, and the proper position and angle of dump of the skip car when discharging onto the small bell.

Small coke units, 7000 to 10,000 lb., are used at all of our furnaces. The methods of charging the ore, coke and limestone vary somewhat at different plants due partly to the individual operator, but mostly to local conditions. At Steelton, with several ores in the mixture, and high percentage of fine ores, each skip of ore contains its percentage of each kind of ore. This gives a very intimate mixing of materials, but has the disadvantage of increasing the error in weight of ore due to greater number of fractional weighings, as well as causing slower filling and requiring closer supervision. At Bethlehem the individual ores are charged in large batches, by rounds, in general along the lines of the Toledo filling system. Good practice is derived from both methods. At the other plants, using but one or two ores in the mixture, the charging is much simplified.

## Record of American Steel in World War\*

Great Help Extended to the Allies Before the United States Entered—Magnificent Achievements After This Country Joined the Forces Fighting Against Autocracy

—BY JOSEPH G. BUTLER, JR.—

IF they are to be estimated at their true values, events must be studied in proper perspective. This perspective extends into the future as well as into the past, however, and it is from the angle of the future rather than of the past that the World War ending with the capitulation of the Imperial German Government on Nov. 11, 1918, deserves to be recorded as the most important event in human history.

It is true that this was the greatest war the world has ever known. Never before was human effort mobilized on so grand a scale. Never were science, skill and physical power combined in like degree for any purpose, good or evil. All of the leading nations of the earth were engaged. The conflict extended to three continents. Battles raged in the air, on land and on the sea, beneath the sea and beneath the land. Directly or indirectly the labor of a hundred million human beings was employed. Six millions perished utterly; fifteen millions were maimed or incapacitated by disease; wealth valued at more than one hundred and seventy-five billions was destroyed, and the productive effort of the most enlightened portion of the human race was for more than four years diverted to tasks of destruction. But all this is no greater than the results achieved. The war has ended for all time the age-old question of the rights of men to self-government. It has relegated to the scrap heap of history the ancient fetish of the divine right of kings; it has opened the way to self-determination of their own destinies by all peoples, and made possible the sweetening and enriching of life for the generations yet to come.

### What Nation Was Pre-eminent?

What nation and what element played the pre-eminent part of this epochal event? Many nations may justly claim each to have made the triumph of the

\*Paper read at the banquet of the American Iron and Steel Institute, New York, May 23, 1919.



J. G. BUTLER, JR.

Central Powers impossible. Belgium held the Teuton hordes at Liege and Namur while France and England, both unprepared, aligned their forces for the struggle. France hurled them back at the Marne and stood like a rock throughout the war. England swept the seas of German commerce and flung her armies half around the world. Russia divided the menace at a time when it would otherwise have been overpowering. Italy held the back door of France. But none of these did more than to prevent the ultimate triumph of despotism. With all of them the war might have ended virtually in a draw. It was reserved for America, and above all, American steel, to win the Armageddon of the modern world.

This was a war of steel. Men and food, heretofore the determining elements of military power, were helpless without steel—steel in unlimited quantities and innumerable forms. The vast armies engaged and the wide ranges of the conflict only served to emphasize the importance of steel. And it was this fact that made Germany and her allies formidable.

Skill and resources for the production of steel are more highly developed in Germany and in the United States than in any other countries of the world. Their

combined production at the beginning of the war exceeded that of all other nations. In America this development was the result of conditions and circumstances, none of which were inimical to the peace and safety of the world, but in Germany it seems to have been brought about as a part of the long-planned ambition to extend German power and influence by the sword. Until the forcible annexation of Alsace-Lorraine, Germany had but little iron ore, and even the mines of that stolen territory did not meet her needs at the beginning of the World War. In 1913 she imported from France, Sweden and Spain more than 12,000,000 tons. Her production of pig iron in 1913 (figures for that year alone being available) was 19,004,002 tons. With this, and the added pig iron output of Austria-Hungary, for that year, Germany entered the war with an annual production of 21,339,192 tons of iron.

#### When the War Opened

The annual iron production of England, France, Belgium and Russia during 1913 was 22,502,819 tons, and considering the relatively large production of unrefined iron consumed by certain industries in Belgium, it is safe to say the war opened with the Central Powers and the Allied nations about equally supplied with steel. Had no other sources of steel been available it is probable that the war would have been of short duration, for although Germany's ore supplied from France and Spain was at once cut off, this had been foreseen and provided for by the militarists who planned the conflict.

The violation of Belgium and the immediate occupation of that section of Northern France containing practically all of her ore and blast furnace equipment, gave Germany a vast additional supply, while at the same time depriving her enemies of nearly half of theirs. Within three weeks after the war opened Germany was in possession of the Longwy and Briey iron basins, in which were located 95 of the 123 blast furnaces on French soil, together with 90 per cent of all French ore. Very soon, also, Germany had possession of the blast furnaces and mines of Belgium, and had added to her resources for the production of steel 7,000,000 tons of iron, at the same time reducing the resources of her then enemies to less than 15,000,000 tons. Russia's small production was not available on the western front at any time, and before long ceased to be a factor. England needed all she could produce, and France was reduced to the minor output of the small St. Etienne fields, with what she could secure from Spain and Algiers under transportation conditions almost impossible, and for the smelting of this she had no furnaces ready. It is evident that under these circumstances the steel production of the Allies was less than half that of their antagonists, and that, unless this condition was speedily remedied the war must end in the triumph of Germany.

#### France Turns to America

As quickly as the French saw that they could not dislodge the Germans from their ore basins they turned to this country for steel. At first it was believed that the Germans, driven back in the first battle of the Marne, could not hold long on the Aisne, and it is likely that if the French had been as well supplied with munitions then as they were later this would have been the case. Toward the end of 1914 both France and England realized the situation, and orders for steel in large quantities began to come to this country. At first the orders were chiefly for barbed wire, shell and shrapnel bars. Later they assumed almost every form in which steel is sold as either finished or semi-finished material.

At this point it may be well to digress from the subject to state that at the beginning of the war its magnitude and probable duration were grasped by very few people, either in Europe or America. The Kaiser had fixed its duration at six months, and even those best informed could not conceive of the conflict that would involve 24 nations and last more than four years. Lord Kitchener was almost alone in his belief that three years would be required to defeat Germany, neither was the war recognized at first in its true light. Americans generally were inclined to regard it as merely a

recurrence of the jealous quarrels that had prevailed from time to time among European nations, and were slow to concede that this country had any interest in the outcome. As time went on, however, and the methods deliberately adopted by Germany to win, together with the purpose her leaders had in mind, became revealed, sentiment in this country underwent a rapid and decisive change.

#### Hard to Be Neutral

I was a member of the industrial commission sent from this country to France in the autumn of 1916 with the purpose of studying conditions there. This commission was composed of business men, and the principal task of its chairman seemed to be the preservation of an attitude of strict neutrality among the members. With more or less difficulty this attitude was maintained by a majority of the commissioners, although I am not ashamed to say that I was not one of this majority. I am likewise proud to state that other representatives of the iron and steel business in this country shared my views. Nevertheless, at that time we were not at war with Germany, and few of our people had yet visualized the conflict on the other side for what it proved later to be—a life and death struggle between democracy and autocracy, in which not only human liberty, but also Christian civilization, as distinguished from the essentially pagan system known as German kultur, faced the possibility of destruction.

It is now a matter for congratulation that the iron and steel producers of America gladly responded to the appeals of France, England and Italy for steel, so supremely essential to their defense. Nevertheless, it is probable that in the state of public sentiment at the beginning of the war we should have sold steel to Germany as readily as to France and England, had that been possible. It was not possible because Germany, in violating Belgium, had forced England into conflict, and England's majestic fleet speedily made the seven seas a highway open only to allied and neutral vessels, preventing shipment to Germany of any materials that could be employed in the prosecution of the war. Later, when the situation became better understood, and long before our Government yielded to the pressure of public sentiment with its too long-delayed declaration of war, American steel manufacturers had been so aroused against the treasonable and uncivilized methods of the Central Powers that it is doubtful if they would have furnished steel for the German armies under any conditions.

As stated, the part played by the American iron and steel industries in the war began early in 1915 with the filling of rush orders for munitions material from France and England. The previous year had been one of marked depression, due in part to the financial disturbance caused by the war, and the output of pig iron was only 23,332,244 tons, as compared with 30,966,152 tons produced during 1913. During December of 1914 production reached a very low ebb, being estimated at between 25 and 30 per cent of capacity for mills and furnaces. With the coming of European demand and somewhat better prices following its appearance, conditions changed rapidly, and in May of 1915, when war orders became a veritable flood, production reached about 80 per cent of capacity. The industries strained every nerve to meet the unusual demand, and by December pig iron production in America had attained a rate of 38,000,000 tons per year.

#### Inspired by High Motives

That much of the astounding energy shown by iron and steel producers during this period was inspired by higher motives than mere profit is shown conclusively by the fact that during 1915 prices advanced but slightly, the increase in the price of Bessemer iron being only \$5 per ton, an amount hardly sufficient to account for the rapidly growing costs of operation. A large amount of steel produced during 1915 went abroad, and a revival of industrial activity in this country increased domestic demand materially, and considerable steel was used in the making of munitions for the allies in hundreds of establishments on this side of the ocean.

The year 1916 was a duplicate of the latter part of

1915, except in the matter of low prices. During that year steel and iron exports, the greater part of which were for war purposes, reached a total of 6,102,104 tons, as compared with exports for the previous year of 3,513,453 tons. Prices advanced rapidly, frequent wage increases were granted, and the industry reached a highly prosperous condition. Pig iron production in 1916 was 42,773,680 tons, up to that time the largest on record.

The flood of American iron and steel and their products to France aroused the ire of the Germans, pointing as it did to the failure of their plan to conquer Europe by seizing the iron ore fields and the furnaces of France and Belgium. Attacks by German submarines on our vessels became frequent. Violation of international law and outrages patently meant to terrorize America were the rule. The sinking of the *Lusitania* on May 7, 1916, with many other occurrences, made it evident that America would find difficulty in remaining neutral. The administration hesitated and delayed, in spite of suggestions that it prepare the country for defense. Finally, however, a survey was authorized to determine the resources of the nation in the event of war, and the iron and steel industries were asked to furnish information as to their equipment and product. This was done without hesitation, of course; but the most striking evidence of the high patriotism of the men engaged in this industry was the almost universal offer of their plants and resources to the nation. Many of them, convinced that war was inevitable, incorporated at this time a clause in their contracts, making such contracts contingent on "the necessities of the Government in time of war or national emergency."

#### Dishonorable Methods of Germany

The last half of 1916 and the early months of 1917 were marked by continued activity in the industries under discussion. They also revealed facts concerning

### Men, Money and Steel for War

The annual report of the United States Steel Corporation for 1918, made public March 30, 1919, gives the tonnage furnished by that corporation during the war to the United States Government and its allies as 18,439,460 tons. Based upon the relative productive capacity of the independent mills during the same period, the total amount of American steel used directly for war purposes could not have been less than 50,000,000 tons.

From the same information it is evident that the industry as a whole furnished not less than 100,000 men for the National Service during this great struggle, as well as that its expenditures for increase of productive capacity needed in the emergency must have aggregated more than \$1,000,000,000.

the dishonorable methods of German diplomacy and a continuation of lawless insolence that made the possibility of continued peace seem more and more remote. Finally, after apparently exhausting every resource to avoid war, the President called on Congress for authority to use the armed strength of the nation to maintain its rights. The resolution declaring a state of war between the United States and the Imperial German Government was signed on April 6, 1917, and three days later relations with Austria-Hungary were severed. The nation was at war.

Instantly the iron and steel industries, in common with practically all others, enlisted without reservation for the country's defense. Judge Gary, our president, was called to Washington for conference with Bernard M. Baruch, who had been appointed chairman of the Minerals and Metals Committee of the Advisory Commission, Council of National Defense, and at the mid-summer meeting of the institute, held at New York, May 25 and 26, the judge announced that the Secretary of War and Secretary of the Navy had requested him to

appoint a committee on steel and steel products, to aid the Government in mobilizing the resources of the country in this line. The directors of the American Iron and Steel Institute had met and appointed this committee, together with six others, to act in conjunction with and have special supervision over all branches of the industry. At this same meeting Judge Gary felicitated the manufacturers on the patriotism shown by the industry and announced, among other evidence of this, that the committee had agreed to supply the immediate needs of the Army and Navy for bars, shapes and plates at \$2.50 and \$2.90 per hundred—about half the prices then prevailing. The tonnage involved was 610,000. Similarly low prices were arranged for the tonnages of sheets and other material needed at once by the Government, this having been done in order that the mills to which this business was assigned could at once proceed to fabricate the steel. It is understood, however, that this extremely low price was tentative and to apply only to this lot of material, since advancing costs made such prices ruinous. The amount saved to the Government by this arrangement was not less than \$15,000,000, as the current prices were much higher and demand from all sources was insistent.

#### Perfect Harmony Prevailed

From that time forward the Government and the industries worked together in the utmost harmony. Prices were advanced to meet rising costs and to provide for the enormous taxes the business was expected to pay. As the machinery of the Government was perfected the iron and steel men were permitted to practically manage their own affairs and they did this with such satisfaction to the Government that J. L. Replogle, Director of Steel Supplies, has paid them a rare tribute since the war closed. Perhaps, however, the best evidence of the high ideals and genuine patriotism of the leaders in these industries is to be found in the fact that they alone, among all the essential industries, were subjected to no arbitrary regulations and price fixing, but were permitted to work out their own programs and virtually suggest the prices that should be paid for their product.

It is true that certain basic prices were agreed upon between the War Industries Board and the General Committee of the Iron and Steel Institute and publicly announced by the President from time to time. These prices were maximum and were absolutely necessary to prevent what is called a "runaway market." They formed the basis upon which the prices of finished products were computed, but the striking fact of the matter is that the computation was left entirely to the steel manufacturers themselves. As a result there may be said to have been no actual fixing of prices in the industry during the war, as was the case in almost every other line producing material necessary to its successful prosecution.

#### Sales to the Allies

The only point upon which the Government exercised its right to dictate to the iron and steel manufacturers, or found it necessary to even insist on a line of procedure, was upon the question of prices to our Allies. Many steel manufacturers, realizing the enormous taxes they were expected to pay, and finding that the prices established by their own committees were very low when these taxes and mounting costs of labor were considered, were of the opinion that a free market should be permitted so far as orders from abroad were concerned. The majority, however, approved of the plan to regard our Allies in the same light as our own Government in this respect, and, as a consequence, although it involved the loss of many millions of dollars in profits, equal prices prevailed.

Largely because of the enthusiastic aid given by practical steel and iron men, many of whom abandoned their own business and voluntarily gave their entire attention to the Government's pressing problems at Washington, a system of allocation for the industries was evolved which contributed much toward their efficiency in the nation's defense. Under this certain classifications were established, and these were served by

the industries in the order of their importance in the great task of winning the war. As a result, practically all the steel manufactured during the period of the war was devoted to war purposes. Of course, much of it was not directly so used, but practically none of it was employed for any enterprise by which the conduct of the war was not vitally assisted.

Because of the rapid advance of wages in all American industries, and particularly in the steel industry, the wage earners of America were enabled to contribute to the financing of the war in a manner that will always redound to their credit. In Germany, by a complicated and insidious arrangement of the governmental machinery, the cost of conducting the war was met largely without the aid of popular subscriptions to war loans. These were taken to a great extent in that country by manufacturers and merchants, all of whom were permitted to profiteer almost without restraint in order that their profits might be invested in government securities. The frightful injustice of this system would have been evident had Germany won, but as the event proved, enormous profits wrung from the German people that they might be invested in war loans have mostly turned to ashes, leaving the profiteers as poor as the people. In this country, while the corporations conducting the industries, and especially those conducting the iron and steel industries, invested heavily in Government bonds, the greater portion of these were taken by the wage earners. No figures are available for the whole country, but in certain districts employees in the last-named industries purchased an average of more than \$500 each in the four loans floated in 1917 and 1918. In one large steel plant in the Youngstown district this average reached the astonishing total of more than \$600 for each employee.

#### Increase in Production

A feature of the part played by the iron and steel industries of the United States in the winning of the war that should not be overlooked was the tremendous increase in production achieved during its period in the face of great obstacles and with the high purpose of providing the materials necessary for the triumph of our country and its Allies. Much of this increase, particularly in certain lines, was made possible by new construction, undertaken in the face of costs that were so enormous as to be absolutely prohibitive if viewed in the cold light of business. The needs of the nation were, however, a compelling argument with these industries. In some cases Government aid and Government guarantees were obtained, but this seems to have been only in such cases as the construction was of such a nature as to leave no prospect whatever of its utility after the war.

Blast furnaces, open-hearth furnaces, plate mills, rolling mills and by-product coke plants costing many millions of dollars were hurried into existence long before their time and without regard to cost, in order that the steel and benzol needed might be made available. As a result of this the steel production of the country had reached, at the time the armistice was signed, the amazing rate of 47,000,000 tons per annum. Plate making capacity alone was increased during 1918 to 7,500,000 tons per year. The output of shell steel was similarly augmented. The expense and uncertainty of investment, as well as the increased capacity that must certainly involve complications after the war, were apparently lost sight of. The steel industry had only one object—to produce as much steel as was physically possible in every form in which it was needed to win the war. It succeeded in doing this to such an extent that Government officials in a position to know all the facts have publicly declared that no part of the Government's tremendous program was halted or delayed at any time because of insufficient steel. No other industry has made a similar record, in spite of the fact that human history contains no story of achievement such as the preparation of the United States for this conflict.

The war is over now. There is reason to hope that history will never see such another. Without American steel, the cause of justice and humanity would have been temporarily lost, and the world must needs have stood

at arms for generations to come. The American steel industry has, through its supreme effort in this most supreme cause, placed itself in a position from which it may find difficulty in extricating itself without a period of severe trial. But it will meet the problems that now face it as it has met others in the past, with courage, energy and vision worthy of its majestic power and inspiring history.

A document signed by the executive officers of the leading steel companies in the United States and by

### Wages Rapidly Advanced

While the iron and steel manufacturers were confronted by a limited advance in prices, they continued to voluntarily raise the wages of their men until the earnings of these employees were the highest ever known. The successive wage increases during the three years ending Oct. 1, 1918, totalled considerably more than 100 per cent. Not only that, but these companies bent every energy toward the financing of the war, buying heavily of Liberty bonds and providing the machinery by which their employees could purchase these bonds, and pay for them in small installments. They led all other industries in their contributions to the many funds raised for humanitarian work during the war, as did also the men and women employed in these industries.

many of them posted in their works during the trying period of 1918—I will read:

#### OUR PLEDGE

For myself, my corporation or my firm, I pledge the prompt production and delivery of the largest possible quantity of material in our departments that is or shall be required by the United States Government for the necessities of itself and its Allies, and agree that all other lines of business shall be subordinated to this pledge, and all this in accordance with the request of the War Industries Board.

The executives who signed this pledge personally asked their employees to join them in it. That both corporations and their employees kept faith is shown by the fact that during 1918 American mills produced 42,212,000 tons of steel, and that of this practically every pound went directly or indirectly into the task of winning the war that has, let us hope, made the world safe forever for the weak and life better worth living for all humanity.

### Men in the War—Liberty Bonds

In connection with the preparation of Mr. Butler's paper, a partial compilation was made as to the number of men contributed by the iron industry to the winning of the war and also the amount of Liberty Bonds subscribed. Statistics from reports of 181 companies have been summarized as follows:

Number of companies reporting.....	181
Number of officers and employees of these companies who were in active service with Army, Navy or Marine Corps.....	76,450
Number of officers and employees of these companies in voluntary or auxiliary service for war work .....	559
Total .....	77,009

#### SUBSCRIPTIONS TO LIBERTY LOANS

Loans	Company Subscriptions	Employees' Subscriptions	Total Subscriptions
First Liberty Loan..	\$30,415,940	\$11,116,410	\$41,532,350
Second Liberty Loan..	69,770,100	31,432,560	101,202,660
Third Liberty Loan..	61,064,350	37,563,837	98,628,187
Fourth Liberty Loan..	83,543,400	70,796,230	154,339,630
Victory Liberty Loan	49,012,500	30,383,600	79,396,100
Total .....	\$293,806,290	\$181,292,637	\$475,098,927
Add unclassified.....	2,150,000	6,338,400	8,488,400
Grand Total ....	\$295,956,290	\$187,631,037	\$483,587,327

### Tunnel Type Japanning Oven

The japan baking and enamelling oven illustrated is installed at the plant of the New York Couch Co., Long Island City, N. Y., and is used for baking the finish on metal frames, brace rods and legs of beds, couches, etc. It is 21 ft. long, 8 ft. wide, 9 ft. high and is insulated throughout with a double course of heat insulating material, protected by a facing of common building brick. The inside walls and ceiling are lined with sheet metal.

The oven is equipped with General Electric heaters and automatic temperature control. The heaters installed total 45 kw. and are distributed under the floor



An Overhead Conveyor System, or Racks on Trucks, Is Used for Transporting the Material Into the Oven

throughout the length of the oven, being connected in series parallel. Two controlling Tycos thermostats, one for each end of the oven, control the temperature, thereby affording an even distribution of heat. The parts to be treated are baked for 3 hr. at a temperature of 170 deg. Fahr.

A ventilating system carries away the vapors which are given off by the japan during baking. Two-thirds of the ventilation is from the bottom of the oven and the other third from the top. Ventilation is provided for in this way, because most of the vapors from japan and enamel are heavier than air and sink to the bottom of the oven.

### A Morgan Bar Mill for France

The Morgan Construction Co., Worcester, Mass., has been awarded the contract for a 12-in. merchant bar mill by Société Anonyme de Firminy of France. The mill is to be placed in a new works of the French company, known as Usines des Dunes, which is being erected near Dunkerque. This bar mill will be similar to one built a few years ago by the Morgan company for the Youngstown Sheet & Tube Co., and will be designed to produce round sections from  $\frac{1}{4}$  to  $2\frac{1}{2}$  in. diameter and flat sections from 1 in. to 6 in. wide. Equivalent weights of angles, beams, squares and other ordinary sections can also be rolled. A large part of the construction work will be performed in France and only a comparatively small amount of special machinery for this order will be built in Worcester.

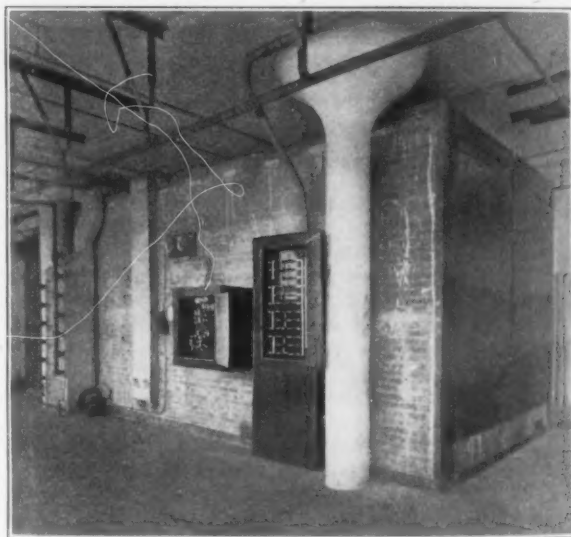
### State of Blast Furnaces in Belgium

The *Moniteur des Intérêts Matériels* has collected the following particulars about the present state of blast furnaces in Belgium: On July 1, 1914, there were in Hainaut and Brabant 30 blast furnaces, of which 24 were in blast, producing at the rate of 3975 metric tons of pig iron in 24 hr. In the Liège district there were on the same date 23 furnaces, of which 18 were in blast, producing pig iron at the rate of 2376 tons per

24 hr. In the Belgian Luxemburg there were 7 furnaces on the same date, all in blast, with a daily output of 706 tons. Or a total of 49 furnaces in blast in the country, with a total output capacity of 7057 tons per 24 hr. Their actual output in the first half of 1914 was 1,233,410 tons. To-day the output is nil. With the exception of the 4 blast furnaces in Hainaut, which had been requisitioned and are in good condition, the others have nearly all been wholly or partly demolished, or are without tuyeres, or have had their machinery removed, etc. Before the war there were in Belgium 50 converters, 19 open-hearth furnaces and 96 rolling mills.

### Manganese Steel in the War

The invention 37 years ago by Sir Robert Hadfield of manganese steel is recognized as one of the great epochs in the history of steel metallurgy, but recent important applications of the material could not have been foreseen or even imagined at the time, says the *London Iron and Coal Trades Review*. It is doubtful, for instance, whether Sir Robert ever supposed that his manganese steel would be worn upon the human head. In the form of soldiers' helmets, however, the material saved many thousands of lives in the British and American armies. The army of one of the Allied countries which used another material did not, unfortunately, fare so well, as the soldiers sustained many lead wounds which the use of manganese steel would have prevented. The British helmet resisted shrapnel bullets striking at a velocity of 750 to 900 f. s., whereas the helmet of the Ally in question when attacked at a similar velocity was easily perforated. Body guards were made of an improved quality of manganese steel. Hadfields, Ltd., supplied manganese steel to the armies representing nearly



Tunnel Type of Oven for Japan Baking and Enameling Metal Bed Parts. The electrical control equipment and part of the ventilating system can be seen

4,000,000 helmets. The company also supplied many hundreds of tons of the material for a war purpose, knowledge of which is still withheld as a secret. All that can be said on the subject publicly is that it destroyed many enemy weapons of attack and that it was impossible to detect the cause of the damage.

The United States Civil Service Commission announces competitive examinations for superintendent of heat treatment (Form 1312) to fill a vacancy in the United States Naval Ordnance Plant, South Charleston, W. Va., at \$5000 a year and for associate enameled metal technologist (Form 2118) to fill a vacancy in the Bureau of Standards, Washington, at \$2200 to \$2700 a year. Applicants should apply to the Civil Service Commission, Washington, for form numbers given, stating the title of the examination desired.

## Continuous Milling Machine

A heavy machine for the rapid handling of heavy milling work has been placed on the market by the Beaman & Smith Co., Providence, R. I. A pair of uprights supports the horizontal spindle heads and the cross rail which carries the vertical spindle heads. Each pair of uprights with its bank of spindles is one milling unit. As many spindles may be mounted on this unit as necessary and as many units may be attached to the bed as are required. Usually two are sufficient. The feed driving mechanism is carried on one unit only.

Removable tables carry the work and feed continuously along the bed, taking a fast motion when the cutters are idle and a slow motion when the cutters are working. These tables, after having passed all the

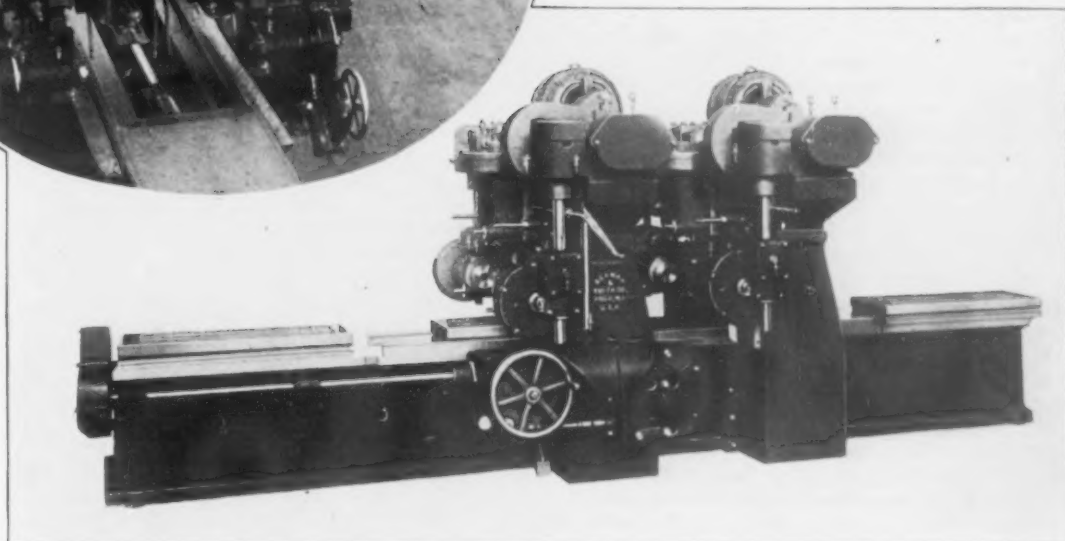
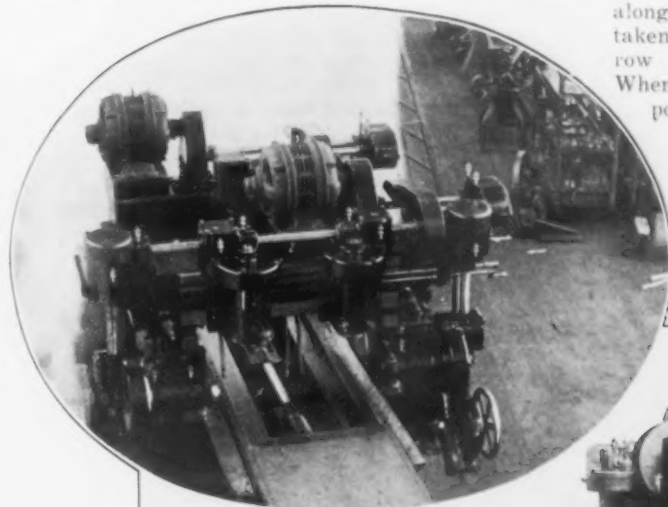
8 in. per min., with a fast motion of about 12 ft. per min. when the cutters are idle. Two changes of feed are possible through change gears at the end of the gear box and two more are possible through a feed gear shifting lever. The feed and fast motion are controlled by one lever which makes it impossible to engage both at the same time. The object of the feed gear shifting lever is to slow down the feed as occasion may require. The feed mechanism is driven by a vertical shaft connected through bevel and reducing gears to the main drive shaft.

Each unit is motor driven. The drive shaft is geared direct to the motor, and, through reducing gears, drives the vertical and horizontal spindles. The spindles can be given various speeds through change gears.

The heads are cast in one piece and are adjustable along the ways by hand-operated screws. Wear is taken up by taper gibs. All have the feature of narrow guide for maintaining accuracy of alignment. When a cutter is located the head is clamped firmly in position.

Spindles are furnished in three standard sizes, the largest diameter in the front bearings being

Removable Tables Provide for Continuous Milling on This Machine. Each table after having passed all the cutters is lifted from the bed and the finished work removed while another table is placed on the front end of the machine.



cutters, are lifted from the bed and the finished work removed. Another table with the work already attached is placed on the front end of the machine and the process is repeated. As many tables are furnished as are necessary, usually four, to maintain continuous milling. The machines on one trip of each table by the cutters will mill two sides and the top of the piece. By loading the tables to capacity, it is pointed out that a large amount of work can be handled in a short time.

The illustration shows a machine with two units and three removable tables. The bed ways on which the tables travel are flat, with slight tapers on the inside edges to accommodate corresponding tapers on the bottoms of the tables. These center the tables without wedging them and allow them to be put on and taken off rapidly. The tables are held against vertical movement while cuts are being taken by gibs fastened to the bed.

A feed shaft, which runs the entire length of the bed and is driven from the front end, carries a series of worms which engage in a rack on the bottoms of the tables. The spacing of the worms, it is emphasized, makes it impossible to set a table in the wrong position on the bed, and no matter where set it will pick up and travel instantly. The tables have feed in one direction and fast motion controlled by hand, forward and reverse.

There are four changes of feed through gearing, providing a variation of from approximately 3 in. to

3½ in., 4½ in. and 5½ in. All sizes can be incorporated on one machine and in heads located as occasion requires. They have hand adjustment in and out of the heads by pinion and rack.

## New Aldrich Pumps

The Aldrich Pump Co., 5 Allen Street, Allentown, Pa., has developed a new wide range pump at its plant, operating at from 60 to 150 r.p.m., with a special system for opening and closing valves at high speed running. The new pump engine will be placed on the market under the name of Ydrange.

A new electric pump has been completed at the plant for the Kingston Coal Co., Kingston, Pa. The pump is a departure from regular types, being operated by a turbine set under ground. The unit is 25 ft. long, 15 ft. wide and 18 ft. high, and weighs about 7 tons. The pump has a capacity of 3,000,000 gal. of water per day from a depth of 700 ft., and will be operated by a 500-hp. turbine. A cement lining has been provided for the pump.

The Bridgeford Machine Tool Works, the Betts Machine Co. and the Ingle Machine Co., Rochester, N. Y., will henceforth handle their export business through their New York office at 50 Church Street, of which F. C. Severin is manager.

# Industrial Democracy Not a Panacea

Warning Against Expecting Too Much from Various Reforms Given at Meeting of National Association of Employment Managers at Cleveland—Profit Sharing Discussed

A SHARP note of warning against shop committees and industrial democracy on the ground that they will lead to labor unionism and to the giving up of control of management to employees was sounded at the third annual meeting of the National Association of Employment Managers held in Cleveland May 21-23. The paper that dwelt most particularly on this subject was presented by W. M. Leiserson, Chief of the Division of Labor Administration, Working Conditions Bureau, United States Department of Labor, who took the view that the solution of labor problems was to be found in efficient scientific management. Another speaker declared that industrial democracy was not a panacea for all the problems growing out of the relations between the employer and employee and that there was as much harm in too much industrial democracy as in too little.

During the three days' session practically every problem that comes up in the employment and handling of men was discussed, and the papers and discussions that followed them indicated that the employment managers are giving the various labor problems more attention than ever before. The speakers showed their desire to give labor a square deal, make them feel that they are a part of an organization instead of merely a cog in a machine and generally to adopt a more progressive policy in the handling of man power, to devote a greater interest in the human well being and to bring about a closer touch between the employer and the employee. The new era in industrial management and tendency toward industrial democracy was recognized and referred to in the most favorable terms by a number of the speakers. It was declared that a wonderful opportunity for service confronts the employment managers in solving the relations between labor and capital. Speakers pointed out that there is yet no standard practice for handling industrial relations and that no set rule or system will prove a panacea for solving employment office problems. Profit-sharing was declared by one speaker not to be a sure cure against industrial disputes, a bonus system being recommended as being a better plan for rewarding the rank and file of the workers.

The meeting was attended by about 1200 delegates, the number exceeding expectation, and necessitating changing the meeting place from the Hotel Cleveland, the convention headquarters, to the Chamber of Commerce auditorium.

## Opposed to United States Service

The employment managers went on record by a vote of 275 to 62 against the continuation of the United States Employment Service, as organized for the war emergency. However, at the same time the question, "Do you favor trying the experiment of a federally directed employment service, so organized that it will properly serve all the elements of the community?" was carried by a vote of 210 to 140.

Chicago was selected as the next meeting place.

Mr. Leiserson, in his paper entitled "Organizing the Working Force," referred to the fact that shop committees and employees' organization plans are spreading rapidly. Employees are organizing in three groups. One of these is a shop committee formed to confer with foremen and executives on safety and welfare work. Here authority stays with the management. The second group includes employers' unions, as adopted by several plants, these representing a long step towards industrial democracy. The third group includes ordinary labor unions and involves collective bargaining which is present only by implication in the second group. Employment managers are recognizing labor

committees, but these will not overcome the defects of poor management. He declared that it is dangerous for an employer to use shop committees unless he wants to give up exclusive control of wages, hours and discipline. In his mind, the shop committees and industrial democracy are not the means to be employed for handling industrial problems, but the desired results should be attained through efficient scientific management.

## Employees' Representation

C. A. Metzgar, assistant to the president of the Bethlehem Steel Corporation, strongly endorsed employees' representation as a means of bringing closer personal relations between employers and employees. He described the plan adopted by the Bethlehem Co., which he said in six months had worked out even better than was expected. In that time 250 cases have been disposed of, 85 per cent of these being settled in favor of the employees. He believed that the closest co-operation and greatest efficiency can be obtained by a plan of employees' representation.

The convention opened Wednesday morning with an address of welcome by Paul L. Feiss, president of the Cleveland Chamber of Commerce, to which S. R. Rectanus, president of the association and director of employment American Rolling Mill Co., Middletown, replied. The first two papers were on "Functions and Scope of the Employment Department." One was presented by A. H. Young, manager industrial relations, International Harvester Co., and the other by Dudley Kennedy, industrial relations counselor, who was formerly connected with the Youngstown Sheet & Tube Co. and had charge of the personnel work at the Hog Island Shipyard during the war. Mr. Young stated that the personnel workers of to-day are the pioneers of a new era in industry. He referred to the development and to the discoveries that changed the fabric of industrial relations, the expansion and consolidation of industries, the perfection of automatic and semi-automatic machinery as developments that brought about a basic revolution of the interests of the employer and employee. Concentration of thought and effort on the human machine, he said, is to-day the cry of the hour. The problem is not one for solution by single minds, nor single schools. Its complete solution will be had only through the intelligent participation of every factor in industry and force in society. The foreman, superintendent, manager, director, stockholder, craftsman, laborer, and the representative of organized labor have each as important a place in solving the problems. Without the effort of each working harmoniously to a common end, no really permanent or worthy result can be obtained. The function of the employment manager or whatever other title he may have is to mature the new interest in the human well-being, to show the foreman, the worker, the officer and the owner the wonderful fruits of mutual service, and to stimulate their effort in its development. "We are in the dawn of the most wonderful period of human endeavor, and if rightly used our efforts cannot fail of fruition," he said.

## The National Safety Council

Mr. Kennedy outlined the development of the employment department during the last few years. Employment as an organized effort has been before the public eye for only a few years, and the Employment Managers' Association is only two years old. The first group, who sensed the problems of industry as known to-day, was the group interested in prevention of industrial accidents which crystallized itself in the National

Safety Council. Ten years ago, coincidental with the inception of the safety movement, a group of University teachers undertook the development of psychology as applied to educational and industrial problems. The present movement owes a great deal to this group of University teachers. The development of alternate study and work plan by one of the professors has also given great stimulus to the work of the present employment manager.

In a paper on "Employment Office Methods" Rodney Morison, Jr., superintendent of employment of the American International Shipbuilding Corporation, warned employment managers to beware of the individual who has a ready-made employment system to sell. He stated that there is no set rule or system to be applied which will prove a panacea for employment office problems. The real problem, he declared, is the intelligent application of the individual employment manager's methods. He should make these methods flexible in order to meet the ever-changing conditions which appear in the labor market.

Mr. Morison's paper was discussed by George D. Halsey, employment manager of the Cincinnati Milling Machine Co., who emphasized the importance of courtesy in the employment department. This takes very little time, and is worth a great deal, he said.

H. L. Gardner, chief employment manager E. I. Du Pont de Nemours & Co., in a paper on "The Relations of the Employment Office with the Foremen and Other Executives," declared that big men in industry to-day are giving great thought to the underlying principles of the human problems. Employment management is still a sales problem, and he doubted if it had ever been sold to the management.

#### Transfer of Workmen

A paper on "Promotions and Transfers," by W. S. McArthur, office manager of Armour & Co., Chicago, was followed by a discussion of this subject by Boyd Fisher, supervisor of personnel, Aluminum Castings Co., in which he referred to a plan which has just been adopted by his company for the transfer of workmen. If a class of work is unduly burdensome, disagreeable or tiresome, the company will set a fixed period of time for which a man will be kept on this work, and at the expiration of that time it will grant requests for a transfer to another department. The company will also set a fixed period of time for a man doing work that may lead to occupational diseases, such as sand blasting or work that causes lead poisoning. In this case an examination will be made of the man to determine whether it is to his interest that he be transferred, and if a place cannot be found for him somewhere else in the plant, the company will try to locate the man in another plant. He pointed out that distinction should be made between transfer and promotions. His company proposes to establish grades rating men according to their abilities. He said that a scheme of promotion should not be rigid, but that the regulations should be in such form that there would be an opportunity for skipping grades in making promotions. Means also should be provided, he said, to reward talent by transfers and promotions. He would not compel a man to be transferred from one department to another provided his health did not demand the change. He favored paying bonuses above the regular piece-work price for men transferred and learning new jobs. He hoped that time would come when all men would be employed through vestibule schools.

Phillip J. Reilly, employment manager Dennison Mfg. Co., in a paper on "Selection and Placement," advanced a plan of providing certificates for good work. He thought a faithful workman who had to leave his work ought to be given a certificate of service in which it was stated that the employee had given satisfactory service and would be given preferential consideration when he wanted to return.

#### Psychological Tests

A paper on "Measurement of Trade Skill and Intelligence" was presented by Walter Dill Scott, president the Scott Co., Philadelphia, who developed the

officers' rating scale during the war and took a large part in working out the trade and intelligence tests in the army. On the subject of psychological tests he said that these tests are new, and since they are shrouded more or less in mystery, they are likely to become fads during the next few years and to be used indiscriminately and harmfully. In view of this the following precautions should be borne in mind. A psychological test should be resorted to only when simpler methods are inadequate. These tests should not be given to the candidate for a particular position until it is thoroughly demonstrated that the tests when applied to the present occupants of the position differentiate the successful from the unsuccessful. Psychological tests should not be given if an exaggerated value is to be given to the grades secured from the test. These tests should not be given until a method has been installed for checking up from time to time the results secured from such tests. These tests should not be given if they humiliate candidates and lower their morale. They should not be given merely because they look sensible, but only because they have been devised and prescribed by an expert for accomplishing a particular result. Psychological tests should not be given for the sake of elimination, but for the sake of placing each individual in the position that requires his particular degree of intelligence.

Tom Wright, manager industrial relations American Multigraph Co., Cleveland, in a discussion on the subject, endorsed Mr. Scott's paper. He pointed out that a skilled worker may fail on psychological tests and a foreman consequently would be prejudiced against him. In the American Multigraph plant these tests were given only to salesmen. In his opinion the most important thing in tests of this character was to find out not only if a particular man was wanted, but to bring out his weaknesses and show him how to improve where he is weak. Thus the tests would be helpful to the man.

A paper on "Training and Placement of the Disabled Industrial Worker" was presented by Douglas C. McMurtrie, director of the Red Cross Institute, New York, who told of the work of the institute for disabled men. An employment bureau handles crippled applicants. Training is given for six or seven trades. Provision has to be made for the maintenance of cripples while they are being trained. These men are loaned enough money to support them during their training and are not asked to pay it back unless after their training they are able to earn more than they did before attending the school. Workers connected with the institute go to hospitals in search of new cases and suggest to the men who have been incapacitated from following their former avocations that they learn a new trade.

"Employer, Employee and the Community" was the subject of a paper by Leon P. Alford, editor of *Industrial Management*. He pointed out that the three groups have interests in common and interlocking, one group being largely dependent upon the other two. He thought it would be a good idea to establish community labor boards in every industrial center, following somewhat the plan that was inaugurated during the war.

#### Confidence the Foundation Stone

"Building up Morale" was the subject of an interesting paper by W. A. Grieves, assistant secretary Jeffrey Mfg. Co., Columbus, Ohio. The general trend of his paper was that industrial democracy might be carried too far, and that it was not a panacea for all problems growing out of the relations between employer and employee. He said that we are in a new era, and it is popular to-day to be alarmed at what may be going to happen. "Let us have all the industrial democracy that we can absorb, but no more," he said. Industrial democracy sounded good, but before we build too high hopes on what it will accomplish, we should not forget industries have progressed satisfactorily under past methods. There is just as much harm in too much democracy as in too little. The plea of the employees for a large part in the management is not so much that they want this power as the idea that they can have it if they want it. To build up morale it is necessary

to understand foundations and material. Confidence is the foundation stone on which morale must be built. There must be confidence between employees themselves, as well as between the employees and the management. There must also be the square deal. The chasm between the management and the employee can only be bridged over by the square deal. Plant managers must dig deeper than any one scheme to bring out an industrial millennium. The whole question resolves itself into common sense, having justice as its foundation. The speaker expressed fear of any plan that aims to bring about industrial utopia. In conclusion, he said:

"I know there is a tremendous scramble these days in an endeavor to inject morale into industry, but it can't be done by the hypodermic route. There is no use in fooling ourselves into believing that we can get in a few weeks or months what naturally requires years to obtain. We are having some splendid examples of the foolishness of this method right now. The biggest wages, the best working conditions, and an honest effort to develop profits 50-50 won't even satisfy. The whole question is a more fundamental one. It goes deeper than any one of 1000 methods. It has as its bedrock confidence. It has as its superstructure a combination of all these factors that go for good will, and these cannot be cataloged. They are found in the hearts of men who have learned to play the game fairly. They are nurtured in the atmosphere of harmony, which in turn is nothing but the culture bed of efficiency."

#### A Community Problem

H. N. Clarke, president the Clarke-Glynn Co., Cleveland, presented a paper on "Breaking in the New Worker." He did not subscribe to the "breaking in" idea, however. He said that often a worker quit rather than be fired for incompetence because by quitting he would stand a better chance of getting another job. Employers should be interested in training men as a community problem, as the community does not want men who are inefficient workmen. He recommended that every employer establish a labor laboratory in which all applicants shall be tested and trained, or both, so that no workman shall start on production work until he is capable of his maximum output. This was not welfare, but a production problem, and the training must have the co-operation of the production

department. Under this plan neither foreman nor fellow workman would be used as an instructor. Instruction must be in charge of a production man and one who is human and patient. The host to a new employee was usually the officer at the gate and the man was left to get information and directions about the plant the best he could from fellow workmen, and this wasted considerable time of both.

The speaker outlined a plan of production training and said a training director should be selected from the production organization.

#### Profit Sharing and Bonuses

Profit-sharing and bonus plans were discussed in a paper presented by Prof. Ralph E. Heilman, Northwestern University, Chicago, who said that in the past few years there had been a large increase of interest in profit sharing. He gave warning that if profit-sharing is used as a substitute for wages, or if lower wages were paid than a man could otherwise obtain it would not work out satisfactorily. The effect sought to be obtained by a profit-sharing plan can be obtained by a graduated bonus system. Another argument advanced in favor of profit-sharing was that it promotes industrial peace. The plan has possibilities in this direction, he said, but they have been over-exaggerated and may lead to new disagreements over division of profits. No iron-clad guarantee against industrial disputes can be had in a profit-sharing plan. In the mind of the speaker, the most important purpose of profit-sharing is to promulgate efficient management from the men higher up, starting with the foremen, rather than to affect the rank and file.

#### Convention Banquet

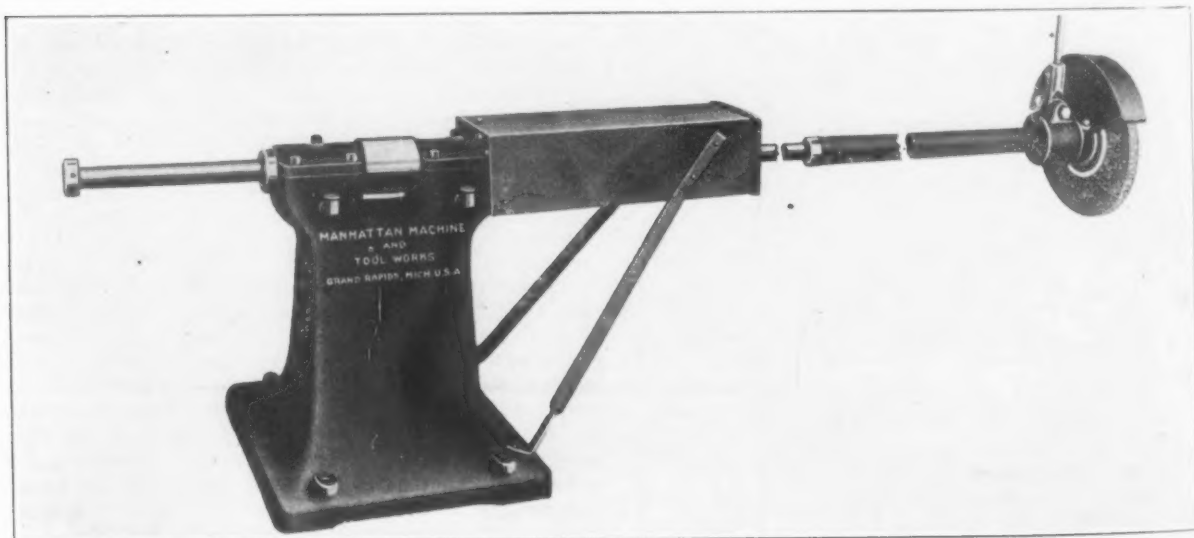
The convention closed with a banquet Friday evening, at which Cyrus H. McCormick, works manager International Harvester Co., Chicago; Herbert E. Rice, treasurer General Motors Corporation, and others spoke. Charles E. Adams, president Cleveland Hardware Co., acted as toastmaster. The subject of the speakers was "Labor Policies." Mr. McCormick said that employees' representation of the form his company has been trying out seemed to be successful, and to be paying from the standpoint of factory production. He declared that the plan is restoring personality to great industries.

### Grinders for Castings

The machine for grinding castings illustrated is manufactured by the Manhattan Machine & Tool Works,

the operator so that a light touch or a heavy pressure can be applied to the grinding wheel.

Lubrication is taken care of by wick oilers and drip cups. The wheel is 12 in. in diameter and runs at a



This Castings Grinder Is Provided with a Universal Coupling and Sleeve to Give Freedom of Movement to the Wheel

Grand Rapids, Mich. Free movement of the grinding wheel is provided by a universal coupling and sleeve, which gives desirable lee-way when grinding in close quarters. The long handle gives a good leverage to

speed of 1600 r. p. m. The longitudinal travel is 12 in. and length of swing shaft is 7 ft. 8 in. The shipping weight is 570 lb. Equipment consists of one countershaft, one counterweight and two pulleys for the cable.

## Bar Mill Reclaims Butt Ends

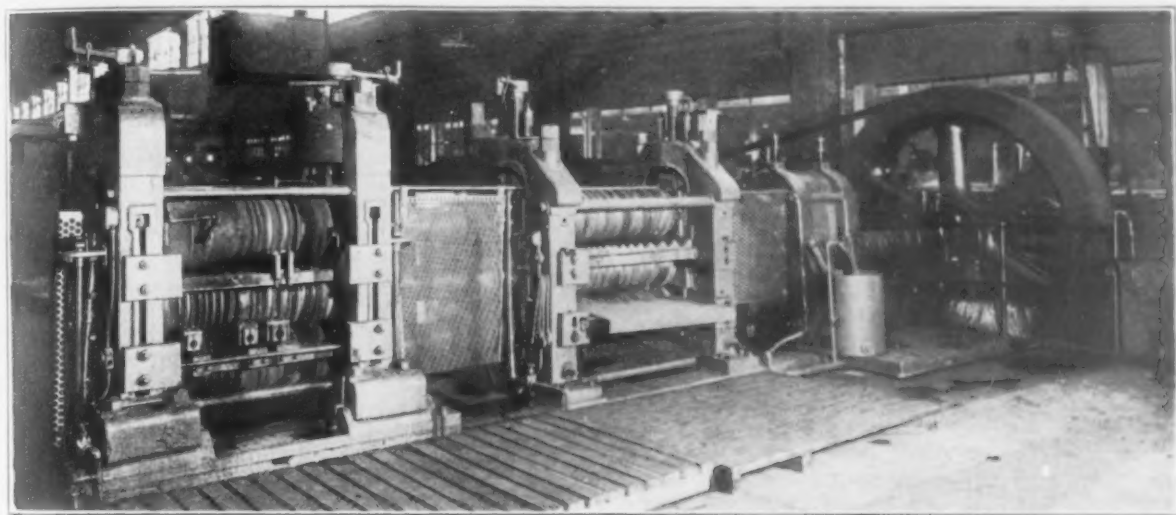
Within the automobile plant of the Ford Motor Co., Detroit, a bar mill has been installed recently to reclaim the butt ends of forging bars by rerolling to smaller sizes and to manufacture alloy and tool steel used in the plant. The mill is located in the forge department, where there is a daily accumulation of several tons of butt ends of bars 12 to 18 in. long, and in 1½ to 3½-in. sections left after the remainder of the bar is formed in upsetting machines.

For some time the company had been working up these butt ends on a set of reclaiming rolls. These rolls have been rebuilt into a roughing stand, a direct drive was substituted for the gear drive and a finishing stand of rolls was added. Both are three-high stands and have 14-in. rolls. The mill is driven by a 300-hp. motor belted to a 15-ton flywheel that is connected to the driving shaft. By the use of the mill the necessity

## Welding in Shipbuilding

Information on electric and acetylene welding in shipbuilding is given by M. J. O'Connell, foreman welding and burning department Federal Shipbuilding Co., Kearny, N. J., in a recent article in the company's publication, the *Federal Shipbuilder*. The following notes are from the article:

We have in operation in our plant various types of electric welding machines using 110-volt alternating current, machines of Holslag transformer and Quasi-Arc resistance types and 220-volt direct current Wilson and also Lincoln motor-generator sets. This current is modified through the machines to 15-35 volts, 100-150 amperes suitable for welding. The alternating current machines are really the practical type of welding machines for shipyard service; occupying only about 12 cu. ft. of space and weighing little more than 200 lb., they are easily moved about to the desired location.



Butt Ends of Forging Bars Are Reclaimed in This Bar Mill at the Plant of the Ford Motor Co., Detroit

of scrapping the butt ends of stock is avoided, as well as the alternative of breaking down the material under a hammer, which is regarded as too expensive a process.

The butt ends are reheated in an ordinary oil type furnace located in front of the mill, but a producer gas furnace will be installed for use in connection with the mill. This will have a 6 x 14-ft. hearth. From 6 to 8 tons of steel is being produced on the mill per day by rerolling the butts of the forging bars down to sections ¾ to 2½ in. in diameter. The mill has a capacity of about 20 tons per day. A straightening machine and hot bed will be installed back of the mill. The mill was designed by Charles Hargreaves, who has charge of its operation.

For the manufacture of alloy and tool steel a 1500-lb. Greaves-Etchells electric furnace has been placed in operation and an additional electric furnace of 3-ton capacity has been ordered. This steel is cast into 10 x 10-in. ingots and broken down into 4 x 4-in. sections on a hydraulic press built by the United Engineering & Foundry Co. The mill has a capacity for taking a billet up to that size. The present furnace is a basic furnace with a conducting bottom, but the larger furnace that is to be installed will have a non-conducting bottom so that it can be operated as a basic furnace for making ingots and as an acid furnace for making alloy steel castings. With the installation of this furnace the company plans to make all of its tool and die steels.

The American Malleable Castings Co., Marion, Ohio, manufacturer of malleable iron castings, is having plans made for the erection of a foundry building 75 x 150 ft. and a two-story core room building 65 x 65 ft. The company states no additional machinery will be required for the present and it is not ready for bids on the new building, but expects to have plans and specifications ready within three or four weeks.

We usually place them on the keel blocks about midships of the hull from where the leads can be run fore and aft, thereby using the least possible amount of cable. The low voltage on the primary side of this type machine is also a factor of safety.

The 220-volt direct current motor-generator sets are located between the shipways at the river end, erected on push cars and covered by shelter houses to properly protect them from damage by storm. These sets consist of a motor and generator together with switchboards and operating panels and weigh about 1½ tons, so that portability being difficult, they are rarely moved. The positive cable is attached to the work while the negative is the electrode side held by the operator. Our shipways are wired especially for welding service.

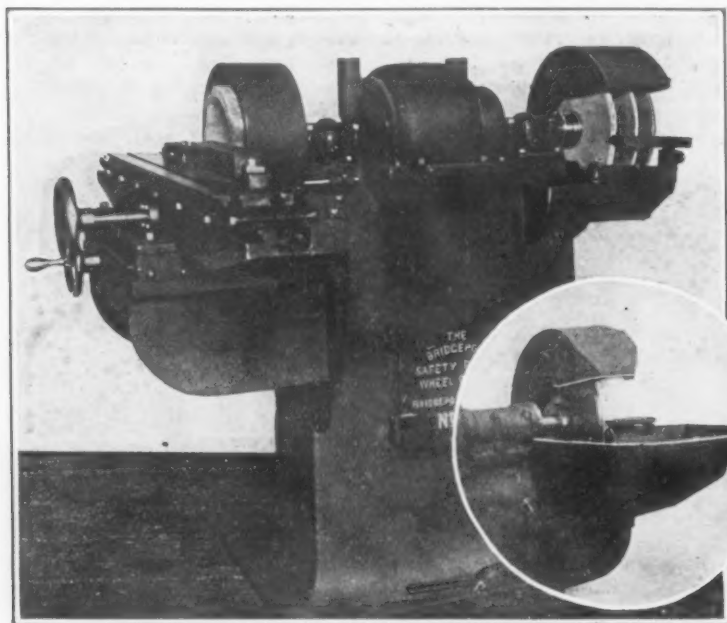
Oxy-acetylene welding is practiced by us principally on castings. The objection to this method on plate work is that the excessive heat is generated through the plate for a considerable radius around the operating point, causing a disintegration of the steel particles in the plate, thereby reducing its strength. Electric welding for this reason is approved and recommended on all plate work, as its heat contact is extremely localized and actually boils to a fusing point only at the spot where the electric arc is applied. Preparation by chamfering or bevelling the edges of the plate is necessary to good welding. The edges should also be clean.

We are constantly repairing parts for machine tools and equipment by the gas method, where it is usually necessary to preheat on a charcoal fire the material to be welded in order to equalize the internal strain and in this way insure a more gradual contraction of the material to its original cast after expansion by letting it die out on the fire. This preheating also reduces the cost of operation as it saves acetylene and oxygen which otherwise would be consumed in bringing the material up to a welding temperature.

## Combination Grinding Machines

Grinding machines equipped with various wheel combinations are announced by the Bridgeport Safety Emery Wheel Co., Bridgeport, Conn. The machines are furnished with a solid wheel or three thin wheels and for dry or wet grinding. One end of the machine is provided with a table with T-slot which can be used for plain surface grinding or for supporting a knife bar.

The base is of cabinet construction with a rigid bracket cast with and forming part of the base of the



Combination Grinding Machines Adapted for Use in Shops Which Have a Limited Amount of Work of Any One Kind to Do. Machines are supplied with a solid wheel in place of three thin wheels and for wet grinding wheel desired. A table with T-slot can be used either for plain surface grinding or for supporting a knife bar.

machine. The top of the bracket is planed to receive a dovetailed table, gibbed and fed up to the wheel by handwheel and screw. On the top of this table is a bed pivoted at the center so it can be tilted around to grind slightly concave or set square to grind flat. On top of this bed is a carriage with two T slots running over a dovetailed track gibbed to take up for wear, operated with a rack and pinion by a handwheel.

Work can be clamped to the carriage or a magnetic chuck can be used, or various fixtures can be arranged for a variety of work.

## Making American Citizens

The making of American citizens is the primary object of the school for employees recently established by the White Co., Cleveland. Two hundred of the company's employees are enrolled in the school, and these are divided into five classes. The men spend one hour per week in the class room during regular working hours, and on the company's time. A course of instruction is provided that is intended not only to fit the men of foreign birth for citizenship, but also to appreciate the American form of government and the opportunities that they enjoy under it.

The text book used is entitled "Lessons on American Citizenship," and was prepared by Raymond Moley, department of political science, Western Reserve University, and supervisor of instruction on citizenship of the Cleveland extension schools. This text book explains free government, gives briefly the story of the United States, and has lessons devoted to the constitution, the national, state and city governments, explaining how these different branches of government serve the people. Lessons are also devoted to the law and the courts and the voting system, and explain how to become a citizen of the United States, and rights and duties of citizenship, and why our country took part in the European war. Extracts from the Declaration of

Independence, Constitution of the United States, and Constitution of Ohio are also included. In connection with the school a branch of the Cleveland Public Library is maintained, and part of the work of the school is to endeavor to get the workmen interested in reading instructive books.

## Lower French Iron and Steel Prices

Some French steel prices are lower. The Comptoir Sidérurgique de France, which is a syndicate of French iron and steel works, and which quotes for such Lorraine and Luxemburg plants as the Burbach, Aumetz, Rombach and Thyssen works, has fixed the following prices per metric ton, American equivalents being given on the basis of exchange equal to 6½ fr. for \$1.

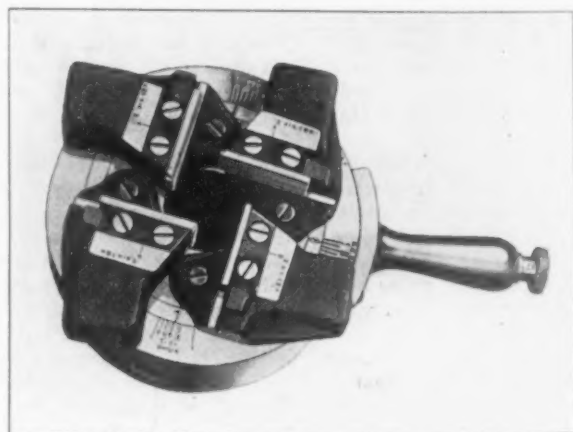
Pig iron, f.o.b. works, 250 fr., or \$38.45; ingots, 350 fr., or \$53.85; blooms and billets, 400 fr., or \$61.50; beams and bars, 520 fr., or 3.60c. per lb., against general prices in France in early April of 5.25c. to 6c.

## New Screw Cutting Die Head

A new style of automatic screw cutting die head which has the chasers supported on the face of the head has been placed on the market by the Landis Machine Co., Waynesboro, Pa. This construction, it is pointed out, permits of easy access to the chasers when it is necessary to remove them for grinding and changing from one diameter to another.

The head is opened automatically by retarding the forward motion of the carriage, and is closed by hand. It is locked by the operating handle which contains a latch having a tongue milled on the lower end. This tongue is milled off center, thereby permitting of roughing and finishing cuts. To adjust the head for either roughing or finishing cuts requires a half turn of the latch to suitable graduations.

The head is graduated for all sizes of bolts and pipe, both right and left hand, within its entire range. It is adjusted to size by a screw which engages the head body. Since the operating, adjusting and closing rings remain in a fixed position when the head is closed, the



This Automatic Screw Cutting Die Head Has the Chasers Supported on the Face of the Head Thus to Permit of Easy Access to the Chasers

rotating of the head body within these rings gives the diameters within the range of the head. To set the head for left hand threading, the screw which locks the latch pin is removed and the latch pin is rotated to the left hand graduation. The locking screw is then replaced and left hand holders attached.

The manufacturer states that the head is applicable to practically all makes of screw machines and turret lathes which have sufficient space to swing heads of these diameters.

## Heavy Duty Planer

The planer illustrated is manufactured by the Streine Tool & Mfg. Co., New Bremen, Ohio, and is intended for heavy work. The beds are of box type with diaphragm extending across the entire top except where an opening for gears is required. The tables are provided with ledges to protect the V tracks from dust and chips. The racks are set into the tables and fastened with cap screws and steel taper pins. The housings are of box construction and are bolted, pinned and keyed to the beds.

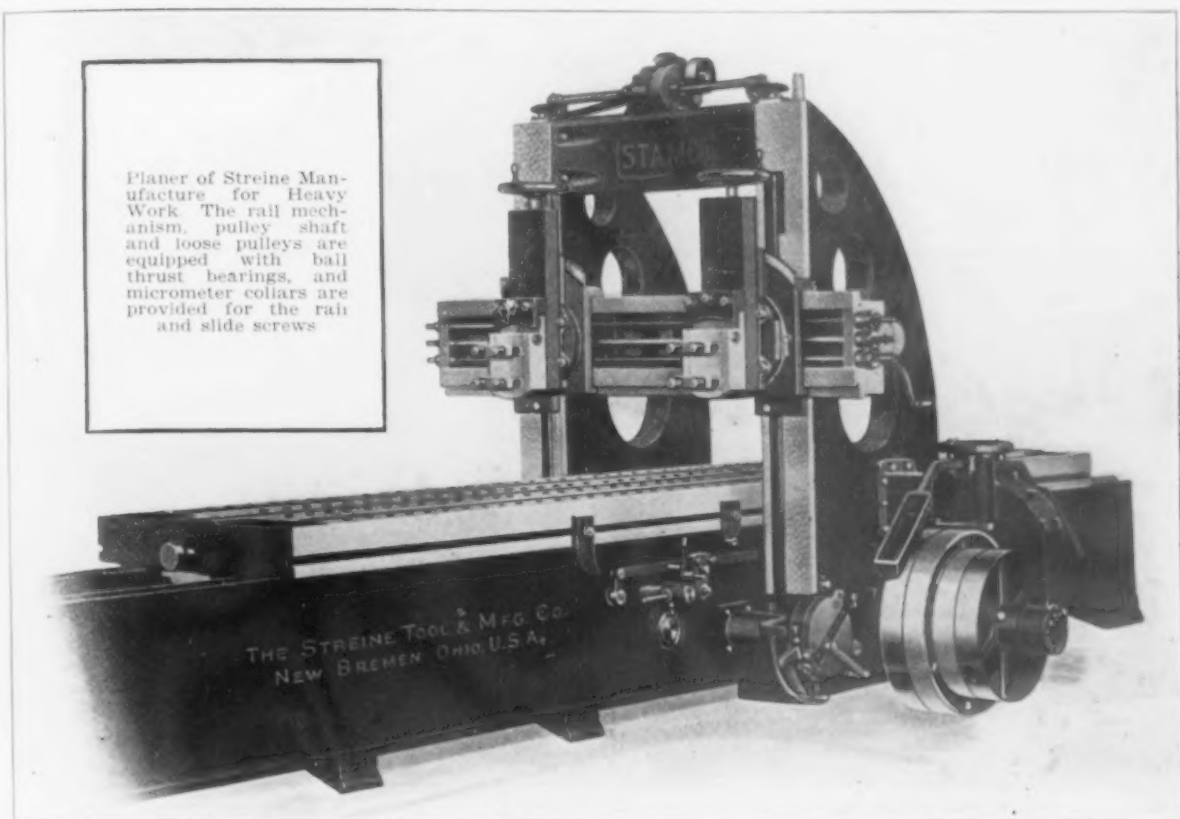
The cross rails have a large bearing surface for the saddle. Rail screws and rail rod as well as rail elevating screws are fitted with ball thrust bearings, and micrometer collars are provided for the rail screws. The heads are fitted throughout with taper gibs. The slide screws also have micrometer collars and ball

architectural iron works are \$30.96, \$21.25, and \$14.52; to workers in machinery plants, \$24.52, \$21.05 and \$13.89; in automobile, carriage and aeroplane plants, \$25.74, \$23.01 and \$18; in car, locomotive and railway repair shops, \$26.96, \$23.57 and \$14.24.

## American International Corporation Consolidates Its Machinery Interests

The Allied Machinery Co. of America has increased its capital stock to \$5,000,000. This was made necessary by the decision of the American International Corporation to group all of its machinery export selling subsidiaries under one head. It contemplates the absorption of the Allied Construction Machinery Corporation by the Allied Machinery Co. of America. The Allied Machinery Co. of France and the Allied Machinery Co. of Italy will retain their corporate entities; but

Planer of Streine Manufacture for Heavy Work. The rail mechanism, pulley shaft and loose pulleys are equipped with ball thrust bearings, and micrometer collars are provided for the rail and slide screws.



thrust bearings. The side heads are of the long feed heavy type, counterbalanced and are fitted with automatic feeds and can be run down below the level of the table. The gearing is large and slow running. The power elevating device is centrally located on the top brace and is operated by a clutch and so designed that it will disengage when coming in contact with any obstruction.

All shafts are fitted with special bushings and the pulley shaft is mounted in long series heavy duty Hyatt roller bearings. The driving pulleys are of aluminum, cast on a semi-steel chill thus reducing their momentum, and the loose pulleys are mounted on Hyatt roller bearings. The shifting mechanism can be operated from both sides of the bed and the table is provided with dogs on both sides. A safety locking pin is provided for each shifter.

## Wages in New York State

There were 9 per cent fewer workers in the factories in New York State in March, 1919, than in March, 1917, but payrolls were 27 per cent larger, according to the Bureau of Statistics and Information of the New York State Industrial Commission. The average weekly earnings in plants making pig iron and rolling mill products were \$33.52 in March, 1919, as compared with \$27.95 in the same month of 1918, and \$15.87 in March, 1915. Similar wages paid in structural and

their parent corporation will be the Allied Machinery Co. of America rather than the American International Corporation as before. This is also true of the Horne Co., Ltd., of Japan, which was purchased early in the year by the American International Corporation. All shares of the Allied Machinery Co. of America will, as before, be owned by the American International Corporation.

The Allied Machinery Co. of America was formed in 1911 by interests associated with the National City Bank of New York to sell machine tools in Europe. In 1916 it was taken over by the American International Corporation, which immediately set about to expand and organize the business. The company to-day is operating in 14 countries.

J. W. Hook will continue as president of the Allied Machinery Co. of America, in general charge of the business. F. A. Monroe, S. T. Henry and T. G. Nee have been elected vice-presidents. Mr. Monroe is in charge of the administrative affairs, Mr. Henry in charge of sales and advertising and Mr. Nee is at present in Japan devoting his attention to the affairs of the Horne Co., Ltd. R. P. Redier is general sales manager, with headquarters at Paris.

The Allied Steel Castings Co., Harvey, Ill., a subsidiary of the Chicago Malleable Castings Co. and the Universal Draft Gear Attachment Co., Chicago, plans to install a 10-ton open-hearth furnace.

## CYLINDRICAL WORK GRINDER

### Machine for Accurate and Continuous Grinding —Novel Wheel Arrangement

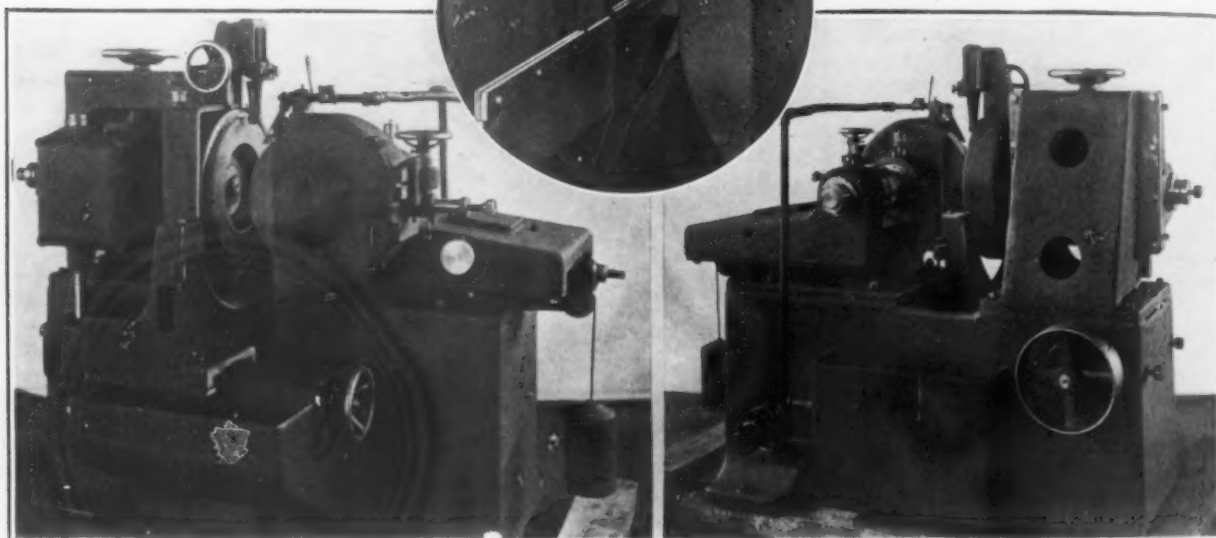
A grinding machine for grinding rolls without holding them on centers has been designed by M. O. Reeves, and has been placed on the market by the Gardner Machine Co., Beloit, Wis. The working mechanism consists of a cutting or grinding wheel, shown to the right in the front view of the machine, which rotates in a counter-clockwise direction at ordinary grinding wheel speed; and a ring wheel, known as the feeding wheel and shown to the left, which is of a fine, hard grain and grit, and which is rotated in a clockwise direction. Between the two wheels is placed a work rest upon which the roll to be ground rests while grinding.

This combination of wheels and work rest when properly adjusted, causes the roll to rotate with the same peripheral speed as the feeding wheel; and by placing the wheel rest so that the center of the roll is in contact with the feeding wheel along a line slightly above the wheel center, the roll is caused to automatically advance or feed past

used when the slide is to be moved by a rapid motion, or by a small hand dial on the side of the slide which provides a micrometer adjustment. The wheel slide is counterweighted to take care of backlash in the feed-screw and nut. A dresser for the grinding wheel is provided at the rear of the wheel-hood permanently mounted in place on the machine. A handwheel at the top of this dresser provides for a traverse motion of the diamond point, while a projecting knurled screw provides for the feed of the dresser.

The feeding wheel, which is 16 in. in diameter, is mounted in a ring chuck and revolves at 6 r.p.m. while grinding. Provision is made for change of speed while dressing the wheel, the dressing speed being 378 r.p.m. The driving wheel is also provided with a permanent dresser actuated by a knurled head screw and a hand-wheel.

The lower part of the base of the machine forms a reservoir for the water used while grinding. The pump, which is driven from the countershaft by a separate pulley, is of the propeller type, and, it is stated, is not affected by grit. An opening is provided at the bottom of the base for cleaning out the reservoir. The machine occupies a floor space of 4½ by 6½ ft., and weighs approximately 4600 lb.



Accurate and Continuous Grinding of Rolls Are the Features Emphasized for This Machine. The cutting and feeding wheels, which turn in opposite directions, and the work rest are so adjusted that the rolls automatically feed past the cutting wheel at any predetermined speed

the cutting wheel at any predetermined speed. The process of grinding is continuous, one roll following another.

The amount of stock removed at each cut depends upon the character of the metal in the roll being ground and upon the accuracy of finish required. As an example of what can be done, the manufacturer mentions that in one instance a 1-in. roll with a scleroscope hardness of 80 was reduced from 0.003 to 0.005 in., when passing through the machine for the roughing cut, and from 0.001 to 0.002 in. by the finishing cut. The commercial accuracy that is obtainable under regular manufacturing conditions is stated to be from 0.0005 to 0.00025 in.

The machine is intended especially for the grinding of rolls up to 3 in. in diameter, and from ¼ to 5 in. long. It is stated to be applicable to the accurate grinding of round straight pieces such as rolls for roller bearings, piston pins, bushings for various purposes, small drills and pins.

The grinding wheel is mounted on a shaft, the bearings of which are supported by a slide. The grinding wheel is 16 in. in diameter and has a feed motion for wheel wear only. Wheel speeds of 1143 and 1800 r.p.m. are provided, the higher speed for use as the wheel wears down. The wheel-slide is actuated either by a handle on the squared end of the shaft, which is

### Exports of Machine Tools

WASHINGTON, May 27.—Despite the embargo on machine tool imports, England was our biggest customer for that product in March, 1919, taking a total of \$1,528,253 worth. The following table, compiled by the Bureau of Foreign and Domestic Commerce, contains the principal exports of metal working machinery by countries for March:

Countries	Lathes	Other Machine Tools	Sharpening & Grinding Machines	All Other Metal Working Machinery
France .....	\$119,527	\$132,595	\$147,277	\$648,842
England .....	358,416	340,050	99,411	730,376
Canada .....	19,090	74,867	9,450	93,826
Mexico .....	10,164	7,992	545	6,583
Cuba .....	12,834	12,608	3,467	22,158
Argentina .....	7,415	7,327	6,698	5,531
Brazil .....	20,507	17,432	2,809	29,827
Peru .....	1,354	350	34	4,320
China .....	29,317	12,814	292	9,578
Japanese China .....	6,628	345	....	5,751
British India .....	3,767	3,535	9,048	16,458
Dutch East In's .....	72,863	13,515	1,259	86,778
Hongkong .....	7,850	521	....	599
Japan .....	210,922	96,906	107,842	663,078
Australia .....	4,917	34,781	9,050	19,841
Philippine Isl. ....	9,501	2,289	1,174	2,951
British So. Africa ..	1,203	6,030	14,027	9,761

## SOLVING THE HOUSING PROBLEM

### The Worcester, Mass., Plan for New Home-Building by Employees

WORCESTER, MASS., May 26.—This city, in common with many other manufacturing communities of the United States, is facing a serious situation in a lack of homes for workers and their families. The manufacturers of the city, representing chiefly the metal-working industries, are proceeding rapidly in the carrying out of a comprehensive plan under which the condition will be remedied by the erection of large numbers of three-apartment houses, the agency employed being a corporation now forming which will finance the undertaking. The city's industrial growth has been all out of proportion to the increase in residential property of every class, and particularly in the kind of houses occupied by employees of the shops and factories. War restrictions, coupled with the very high prices of building materials and labor, have set building back several years as compared with the increase in normal needs.

At the instance of the Chamber of Commerce a committee was formed to procure a solution of the difficulty, including in its membership such men as George N. Jeppson, works manager of the Norton Co., the chairman; Clinton S. Marshall, district manager of the American Steel & Wire Co.; George F. Fuller, head of the Wyman & Gordon Co.; Frank H. Willard, of the Graton & Knight Mfg. Co.; Lucius J. Knowles, head of the Crompton & Knowles Loom Works; Harry W. Goddard, president and treasurer of the Spencer Wire Co., and Louis H. Buckley, of the United States Envelope Co. The sub-committee which is organizing the corporation consists of Messrs. Jeppson, Willard and Buckley.

The project will be pushed to quick completion, since it is being handled as an emergency measure. The savings banks of Worcester have offered hearty co-operation, which will greatly simplify the financing and enable the carrying on of building on a large scale without the outlay of a very great amount of actual money.

The general plan is to build groups of three-tenement houses of what is commonly called the three-decker type, a group in each of the industrial sections of Worcester, so that men may live within easy distance of their employment. Each group will have at a minimum 25 tenements, beyond which number economy of construction makes itself felt to an important degree. The total number of houses to be erected is

not decided, but undoubtedly the initial effort will comprise about 300 tenements. Model plans for such buildings have been worked out, with the dual purpose of securing not only comfort and convenience, at low rental, but architectural beauty, as compared with the too severe plainness or the cheap ornateness which in this class of building has done much to make unattractive many neighborhoods of American cities. The effort will also include the attempt to relieve the usual distressing regularity of lay-out, by the employment of curving streets and avoidance of some of the right angles; also by alternating the few designs of houses to avoid the effect of repetition.

The plan is not to rent the new property, but to assist workers to secure ownership of homes, following to a large extent the method employed by the Norton Co. in establishing its Indian Hill community of homes, hard by the plant at Greendale. The man who takes advantage of the opportunity will house his own family and have as tenants two other families.

The purchaser will pay some cash down, a savings bank will take a first mortgage for a large part of the purchase price, and the housing corporation will finance the remainder in some sort of second mortgage arrangement. It is calculated that the owner, through his rentals, including that paid by himself, will be able to pay up his second mortgage in a few years, after which he will have to pay only the interest on his first mortgage as his rental, and the income from his two extra tenants will continue as profit on his investment.

By building these houses in groups the cost of land and construction will be considerably lessened. The plans call for five-room tenements, modern in all respects as to conveniences and sanitation. Worcester, in spite of its 200,000 population, is blessed with an abundance of really good land for residential purposes, and the land is not held at excessive figures. Buildings as proposed, well located, will cost, land and all, about \$8,000. The rental can be as low as \$23 a month, and still give the owner 10 per cent gross on his investment, which is all that it is usually expected from city real estate. Present rentals for equally good homes are far in excess of \$23; in fact, very much inferior dwelling places cost, as a rule, more than that figure.

It is confidently expected by the men who are interested in Worcester's housing plan, that the first 100 houses will be followed by other groups. The only limit set is the number of workers who desire to avail themselves of the chance to own their homes under the conditions offered.

### American Steel Treaters' New York Meeting

The first public meeting of the New York chapter of the American Steel Treaters' Society was held Friday evening, May 23, at the Engineering Societies' Building, New York. An unusually large attendance, about 150, marked the launching of this undertaking. The principal address was delivered by W. H. Eisenman, business manager of the society in Chicago. The speaker gave a most interesting account of early experiences in heat treating steel, of some of the merits and demerits of present practice and concluded with a vivid forecast of future possibilities. The chairman, Frank P. Fahy, consulting engineer, New York, then delivered a brief outline of the chapter's aims and rules. Other speakers were, C. H. Schultz, H. Boker & Co., Brooklyn, and Edwin F. Cone, associate editor, THE IRON AGE, who briefly discussed some of the benefits which the local chapter could bestow on its members. The prospects of a large membership are good. L. R. Seidell, New York Testing Laboratories, 74 Washington Street, New York, secretary-treasurer, can be consulted by those desiring to join the organization.

An important announcement was to the effect that the national organization plans to erect a large central laboratory for consultation and industrial research problems in heat treating.

### Foreign Trade Convention at San Francisco

The seventh National Foreign Trade Convention will be held in San Francisco May 12 to 15, 1920, the first time the gathering place has been west of St. Louis. The choice was influenced by the growing importance of the Pacific Coast in the foreign commerce of the country. Among those who will be especially interested in the location are: Importers, as the nation's main supply of vegetable oils, tea, rubber, silk and tin come through these ports; shipping men, who will be interested in the operations of the Japanese merchant fleet; traffic managers from the interior who will be able to see and judge the ports through which their goods pass; agricultural interests concerned with foreign outlets. Seattle, Tacoma, Portland and Los Angeles will share in the attention of the visiting delegates.

### American Electrochemical Chicago Meeting

The fall meeting of the American Electrochemical Society will probably be held in Chicago on Sept. 23, 24 and 25, with sessions each morning for reading and discussion of papers. It is hoped to arrange a joint session on electric furnaces and electric steel with the American Institute of Mining and Metallurgical Engineers, which meets in Chicago the same week, in connection with the National Exposition of Chemical Industries.

## Independent Feed Rail Drill

The rail drill with independent heads illustrated is manufactured by the Defiance Machine Works, Defiance, Ohio. It is a heavy service production tool especially intended for use in locomotive and railway shops, gas engine and automobile factories, but it will also serve in general machine shops where the work includes heavy gang drilling or heavy jigged drilling. When used on jigged work, the compactness of this drill, it is pointed out, enables one operator to keep a greater number of spindles, either singly or in groups, continually in operation. The speed mechanism, feed mechanism, and each spindle head are of unit construction, and each unit is readily accessible without disturbing mechanism other than that contained in itself.

The speed mechanism is attached to the upper end of the upright at the left end of the frame. It consists of two cones of steel gears, back gears, and a hardened roll-in gear. There are three gears on each of the two cones, which provide three sets of gears of a different ratio, and these three sets of gears when used in conjunction with the back gears allow six speed changes which are selected by rolling the roll-in gear into mesh with the various sets of gears on the cones. The shafts in the speed box rotate in Hyatt roller bearings, and the drive shaft, which transmits the power from the speed

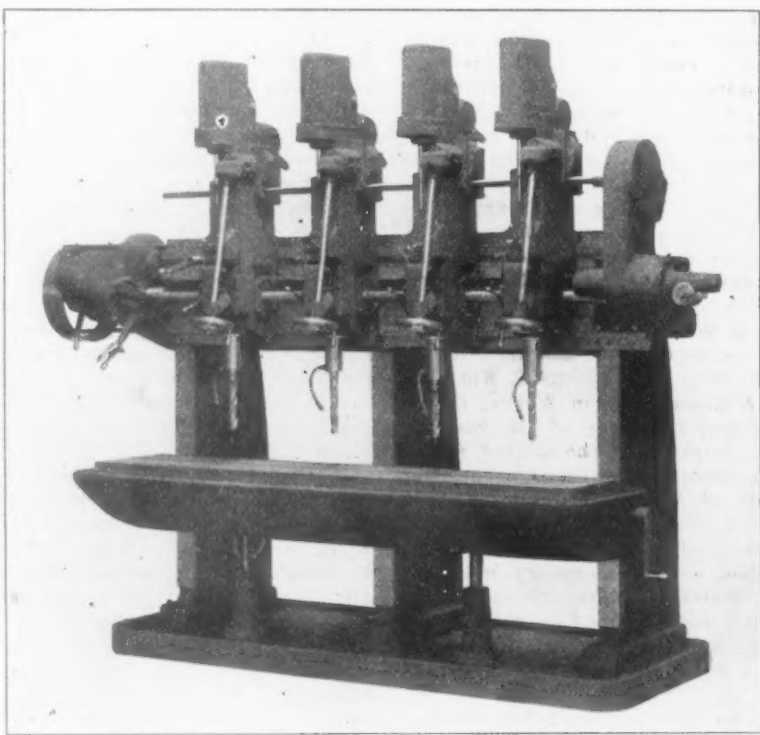
mechanism to the spindles, rotates in combined radial and thrust ball bearings. Power is applied to the speed box through a constant speed pulley, and transmitted through a Johnson friction clutch, which is used to select the back gear.

The feed mechanism is tightly encased, and is fastened to the upper end of the upright at the extreme right end of the frame. The feed changes are obtained through two cones of gears which are driven by the spindle drive shaft. Each of the two cones is fitted with three gears of a different ratio, which allows three changes of feed for each spindle speed. The feed changes are effected by a slip key method which is operated by an indexed hand lever. The feed is transmitted from the two cones of gears to the feed shaft through miter gears and a worm and worm gear, with end thrusts taken by ball bearings. A hand wheel is also provided for quickly advancing or returning each spindle.

The spindle heads are gibbed to a heavy cross-rail by a dovetail method. Each head is adjustable longitudinally along the rail by a crank handle which operates a rack and pinion mechanism. The spindles are driven by spiral gears with two keys extending from the gear through the sleeve and into ways in the spindle. The end thrust on these keys and spiral gear is taken by a large ball bearing, while the spindle thrust is taken by S.K.F. ball bearings. This drive is

located at the lower end of the head, thus to reduce torque in the spindle to a minimum. Each spindle is counterbalanced, and can be driven and fed independently of the others. The levers used to apply the feed and drive to each spindle are interlocking so that the power feed cannot be engaged when the spindle is not being driven. Adjustable stops are provided to automatically disengage the feed when the holes have been drilled to a given depth.

The table is a box type casting which is adjusted vertically by a crank handle which actuates two jack screws through a worm and worm gear mechanism. A cored section of the table serves as a reservoir for the cutting compound, and the table casting is shaped on all four sides so as to form a trough in which the cutting compound flows back to the reservoir. The pump which forces the cutting compound to the work, is fastened to the upright at the left end of the frame and is driven directly from the countershaft. The speed mechanism, feed mechanism, and each of the spindle heads are provided with independent and self-contained oiling systems. The contents of each unit is partially submerged in a bath of oil, while the bearings are lubricated by a force feed through individual leads.



The Speed and Feed Mechanisms and Each Spindle Head of This Heavy Duty Rail Drill Are of Unit Construction. The machine is made compact so as to enable one operator to keep a greater number of spindles continuously in operation. The specifications are as follows: Capacity in solid steel, 2 in.; maximum center to center of spindles, 8 in.; maximum center to center outside spindles, 78 in.; length of power feed, 12 in.; working surface of table, 20 x 98 in.; vertical adjustment of table, 12 in.; six speed changes from 25 to 186 r.p.m.; three feed changes, 0.006, 0.009 and 0.014 in.; Morse taper in spindle, No. 5; floor space, 56 x 144 in.; net weight, 12,180 lb.; electric motor required, 10 hp.

The German export price to Switzerland of beams having been reduced by a further 100 fr., the price in early May was 500 fr., or about 3½c.

per lb. The reason for this reduction is that the French for some time past have been undercutting the prices of the German Steelworks Union in Switzerland, by material from the Lorraine works. The sales are in the hands of a new group, composed of Swiss merchants, under French control, who do not belong to the Swiss Merchants' Association of the German Steelworks Union.

### May Cancel Plate Mill Contract

According to a statement from Ottawa, Ont., it is regarded as practically decided that the contract with the Dominion Iron & Steel Co., to build a plate mill at Sydney, N. S., will be cancelled. Mark Workman, president of the company, and C. C. Ballantyne, Minister of the Naval Service, will have a conference to discuss the whole matter. It is believed that a new contract will be offered the company in which the Government would agree to give a small amount per ton over the Pittsburgh price, and would guarantee to take about half the amount it would be obliged to take under the existing contract. If the present contract remained the Government would pay \$83 a ton and take 250,000 tons in five years.

The Pomeroy Machine Co., Pomeroy, Ohio, is planning to rebuild that part of its plant recently damaged by fire.

# Director Hines Criticizes Steel Prices

Says He Is Compelled to Accept Tonnage  
Owing to Urgent Need of Railroads—  
Mr. Peek Says Statement Is Misleading

WASHINGTON, May 27.—Director General Hines' order for 200,000 tons of open hearth rails at \$47 a ton is merely another chapter in the fight over steel prices that began a year ago when the Railroad Administration failed in its efforts to have the War Industries Board cut the war price of rails.

Mr. Hines accompanies his order with a long statement denouncing the prices as "unreasonably high" and expressing his "emphatic disapproval of the prices and the manner in which they have been established." This manner he charges to the leadership of the United States Steel Corporation.

There are rumblings in Congress that threaten an investigation from that end of the avenue. There are always members in both houses who will be glad to find an opportunity to make political capital out of such an investigation. So far there has been no public pronouncement. It is promised, however, that Director General Hines' appearance before the Appropriations Committee of the House of Representatives to ask a revolving fund of \$1,200,000,000 may be the occasion for the first outburst. Attorney General Palmer has refused to discuss any phase of the controversy. Chairman Peek of the late Industrial Board gave out a short reply to Mr. Hines' charges but that was the only answer in official circles. When Secretary Redfield, in the Department of Commerce, was asked whether he had anything to say, he shrugged his shoulder and replied emphatically:

"I should say not."

The order for the 200,000 tons of steel was divided among six bidders. The seventh bidder—the Midvale Steel & Ordnance Co.—bid \$57 a ton for these rails and therefore got no contract. The other six companies handed in identical bids. Three of these—the Carnegie Steel Co., the Illinois Steel Co., and the Tennessee Coal, Iron & Railroad Co., subsidiaries of the United States Steel Corporation; were given a joint order for 100,000 tons. The Bethlehem Steel Co., and the Lackawanna Steel Co. got orders for 40,000 tons each. The remaining 20,000 tons for Pacific Coast needs, was assigned to the Colorado Fuel & Iron Co.

Railroad Administration officials decline to discuss the prospects for further orders. It seems doubtful, however, whether there will be any more orders before fall. The administration still has between 400,000 and 500,000 tons of old orders coming. With the new contracts for 200,000, it is estimated that, at the present rate of track building, the administration will have enough rails to last until October.

## Director General Hines' Statement

Mr. Hines' statement reads:

"When the Industrial Board approved the prices proposed by the steel interests it became at once apparent to me, and I so indicated in various discussions with representatives of the Government, that that approval would encourage the steel interests to stand together on those prices even though Governmental approval was withheld. I felt, however, that even so, it would be far more in the public interest for the Government to withhold approval, and, if necessary, pay such prices, for the time being under protest, rather than indorse the prices, and that, too, for the entire calendar year, as was proposed by the Industrial Board, and thereby give an official sanction to prices which were unreasonably high, and which would merely serve as a starting point for still higher prices later on.

"The result has been in exact accordance with this forecast. Six of the leading steel interests, in response to the Railroad Administration's request for bids for steel rails, have submitted bids which are uniform in

all respects as to prices and conditions of manufacture and are in strict accordance with the prices proposed and approved by the Industrial Board.

"In view of the immediate need for 200,000 tons of steel rails, orders have been placed at the price thus indicated (that is, \$47 per ton for open-hearth rails), for that quantity with the Carnegie Steel Co., the Illinois Steel Co. and the Tennessee Coal, Iron & Railroad Co., all of which are subsidiaries of the United States Steel Corporation, and with the Colorado Fuel & Iron Co., the Bethlehem Steel Co. and the Lackawanna Steel Co. This action is taken not only without approval of the prices but for the reasons shown below with emphatic disapproval of the prices and the manner in which they have been established.

"That action of these six steel companies in making uniform bids was taken under the leadership of the United States Steel Corporation is clear from the fact that immediately after the Railroad Administration announced finally that it would not approve the prices fixed by the Industrial Board, Judge Gary for the Steel Corporation took the initiative in announcing publicly that the Steel Corporation was strictly maintaining the prices approved by the Industrial Board, and that it seemed to him that would be the attitude of other manufacturers. The subsequent action of the Steel Corporation and the other manufacturers in submitting their bids has accorded completely with Judge Gary's announcement.

## Steel Corporation Earnings

"The Steel Corporation's annual report to its stockholders shows that after paying all wages and other operating and maintenance expenses and allowing most liberally for renewals and paying interest on debts of subsidiary companies, and also taxes other than war taxes and excess profits taxes, it had net earnings on all rolled steel products of \$21.58 per ton in 1916, \$35.73 per ton in 1917, and \$33.53 in 1918.

"It is a remarkable fact that in the calendar years 1917 and 1918 the net earnings of the Steel Corporation aggregated approximately \$1,000,000,000, being in excess of the annual rental which Congress has sanctioned as reasonable for practically the entire railroad mileage in the United States. It is true the Steel Corporation had to pay out of these net earnings heavy excess profits taxes to the Government, but even after paying these taxes, making liberal allowance for depreciation and extraordinary replacement funds, and after paying interest on bonds and 7 per cent on preferred stock, there remained an earning of 39.2 per cent on its common stock in 1917 and of 22 per cent on its common stock in 1918.

"The fact that excess profits taxes were paid out of the net earnings in 1917 and 1918 does not in any way detract from the accuracy of those net earnings as a measure of the productiveness of the war prices which were charged by the Steel Corporation.

"These figures of actual net earnings per ton on the entire output of the Steel Corporation are much more convincing than estimated costs of rolling a particular steel product at a particular mill. The estimated costs may show the greatest variation, but the ultimate result is an enormous profit to the stockholders of the corporation. The claim that the wages of labor would be endangered by a reasonable price on steel is therefore not convincing.

## Earnings of Other Companies

"Heavy profits are not confined to the Steel Corporation. It appears that the net earnings of the Lackawanna Steel Co. were \$12.40 per ton in 1916, \$24.81 in 1917 and \$19.88 in 1918; of the Republic

Iron & Steel were \$13.88 per ton in 1916 and \$25.92 in 1917, and its profits for 1918 are not yet available; of the Colorado Fuel & Iron Co. were \$9.57 per ton in the year ending June 30, 1916, and \$13.91 per ton in the year ending June 30, 1917. The Bethlehem Steel Co. furnished no reports that give any information as to the profits per ton.

#### Price of Scrap

"In considering all these profits it must be remembered that the reductions from war prices, which were proposed by the steel interests and are now being adhered to by them as the greatest reductions they are willing to make, are practically completely offset by the great fall in the price of scrap iron alone (which can be and is used largely as a substitute for pig iron in the manufacture of steel), without regard to the various other reductions in cost which are coming about as a result of readjustment to peace conditions.

"A seventh steel company, the Midvale Steel & Ordnance Co., in response to the request of the Railroad Administration for bids, proposed prices \$10 in excess of the prices proposed by the other six companies. It is interesting to note that the company which made this proposal showed on its all-steel products net earnings in 1916 of \$24.62 per ton, in 1917 of \$44.23 per ton, and in 1918 of \$35.93 per ton. Its apparent position now is that it cannot afford to make any reduction in the price of steel rails without reducing the wages of labor.

"It is important to remember that the present policy of the steel interests in adhering to high prices on the ground that the present high costs necessitate these prices is a policy that does not work both ways. It is a policy to keep prices from going higher as business increases and costs diminish. It will be remembered that the Industrial Board announced that the public could not expect prices to be lower during this calendar year, but it gave the public no hope that they would not go higher. The resumption of business in the country will probably result in the substantial diminution in the cost of steel production, but unless the attention of the public is constantly centered on the situation there is danger that the steel interests will take advantage of the increased demand to increase the prices of steel still further, even in the face of declining costs.

#### Charges Plan to Maintain Prices

"The situation in the steel industry is of greatest moment to the American public. The United States Steel Corporation is the largest producer and controls approximately 50 per cent of the output. It takes the lead in maintaining a price which, if its reports to stockholders are reliable, indicates a grossly excessive profit, and it does this for the avowed purpose of protecting alleged high cost producers which, however, so far as they make detailed reports on the subject to their stockholders, also indicate large profits. In other words, the Steel Corporation appears to take the position that for the protection of other prosperous steel

producers it is unwilling to initiate any competition in the steel industry and naturally these other producers are glad to follow this lead, and, incidentally, this position enables it to continue the enjoyment of very high profits.

"This condition operates to suspend the law of supply and demand when it could work in favor of the consumer, but it leaves that law free to operate with the greatest effect when it can work in favor of the manufacturer. This situation also works to deprive the public of the benefits of the increased efficiency due to the great combinations in the steel business. Those combinations are the result of public acquiescence, and yet all the benefits of them go not to the public but to the private owners. The more powerful the combinations become the more successful they are in keeping up prices.

"These reasons lead me to reiterate that the prices in question are unreasonably high at present, and will become progressively more unreasonable as business improves and conditions become more nearly normal."

#### Mr. Peek Replies to Mr. Hines

Commenting upon the statement of Mr. Hines, George N. Peek, formerly chairman of that board, made the following statement:

"The statement of the Director General of Railroads is perhaps misleading in that he uses as a basis for his deductions the profit showing of the past three years when steel mills were crowded to capacity on account of war demands, and during a considerable part of which period prices were fixed by the Government with the idea that production must be stimulated to the limit.

"If the Director-General desires to be fair, why does he not take selling prices for the pre-war period on rails, for example, and admit that to the pre-war price of rails, \$30 a ton, there must be added approximately \$20 per ton on account of the increase in direct labor cost alone, exclusive of the increase in cost of labor in transportation? And further, why does he ignore the fact that since the signing of the armistice, steel prices generally have been reduced between 15 and 25 per cent?

"The statement is further misleading in that Mr. Hines neglects to inform the public that the price at which he finally concludes to purchase rails, \$47 per ton (the figure approved by the Industrial Board) is \$5 per ton lower than the best the Railroad Administration was able to secure for itself before the Industrial Board considered present costs of production."

Mr. Peek then quotes the following from page 27 of the minutes of the meeting of April 5 between the Industrial Board and Mr. Hines' representatives, Judge Lovett and Henry Walters and H. B. Spencer, Director of the Division of Purchases of the Railroad Administration:

"MR. PEEK—I understand the best price you were able to secure three weeks ago was \$52 a ton. This price is \$5 under that.

"Mr. Spencer said: 'True.'"

#### Shell Contract Commission Suit

Early in 1915, when the manufacture of munitions in this country first began to have serious consideration outside of the United States Government requirements, the Crucible Steel Co. entered into an arrangement with Samuel W. Traylor, Allentown, Pa., whereby he was authorized to solicit orders for certain kinds of munitions, his compensation to consist of a percentage payable "as and when" the Crucible company should receive its money for its deliveries. According to the testimony, Mr. Traylor went abroad and obtained from the British Government orders amounting approximately to \$9,000,000. The Crucible company immediately constructed and equipped an extensive plant at Harrison, N. J., for the manufacture of the munitions ordered, which consisted of shells of various dimensions, ranging from 5 in. to 15 in. in diameter. There were some delays in the production of the shells and it finally became necessary to obtain extensions of the time within which to make deliveries. The Crucible

company continued to encounter difficulties and had not fully completed deliveries when the extended periods expired, and the British Government cancelled the contract to the extent that the deliveries had not been made.

Mr. Traylor sued for substantially \$600,000, claiming commissions not only upon all the shells delivered, but also upon the amount of the cancelled orders. The case was tried in the Supreme Court in New York County, and the verdict was for the sum of \$198,724.35, which was the balance of the amount of compensation plus interest on the total value of the shells actually delivered.

Improvements involving expenditure of \$1,200,000 by the Carnegie Steel Co. at its Farrell, Pa., plant will be completed in June. They include ore bins, steel trestles, car dumper, ore bridge and rebuilding of blast furnace No. 3. All of the improvements are completed except the blast furnace rehabilitation, which will be finished next month.

## SHORT TRADE ITEMS

The Macomber & Whyte Rope Co., manufacturer of wire rope and wire, Kenosha, Wis., has opened a branch at Birmingham, Ala. under the direction of James A. Boope, Southern manager, 805 American Trust Bank Building. The company has opened a New York branch at 30 Church Street, under the management of E. E. Robirds, who has been with the company for 10 years, having been manager successively for the Pittsburgh and Chicago offices before the opening of the New York branch.

The Canton Rim Co., Canton, Ohio, manufacturer of two-piece solid base detachable demountable automobile rims, has bought a two-story factory in Louisville, Ohio, with a floor space of 12,000 sq. ft. The company will use this building in the manufacture of its present line of automobile rims and is in the market for grinding machinery, also a japanning process including drying ovens, and the necessary equipment. It will also buy small electric motors.

The Pacific Alloy & Steel Co., Stockton, Cal., has been incorporated with a capital of \$2,250,000 by J. M. Kroyer and F. B. Nims, Stockton; W. H. Metson, C. D. Clarke and Henry A. Koster, San Francisco. The company is to take over and enlarge the Pacific Electric Metals Co., Martinez. This plant has been engaged in the manufacture of ferromanganese and silico-manganese, and will make in addition ferrochrome, ferro-tungsten, ferrovanadium and alloy tool steel.

William Wharton Jr. & Co., Inc., at Easton, Pa., a subsidiary of the Taylor-Wharton Iron & Steel Co., is installing tools and equipment for the production of seamless steel gas cylinders used for the transportation of compressed gases. It is expected that manufacture will begin about July 1. Taylor-Wharton Iron & Steel Co. headquarters for gas cylinder sales will be located at the New York office, 30 Church Street. Charles L. Gulick, manager of cylinder sales, will answer inquiries.

The Tropenas Converter Co., 2243 Nostrand Avenue, Brooklyn, has received contracts for the equipment of two complete steel foundries for the Brazilian Government at Rio de Janeiro. This company is also equipping several other foundries in South America and China, and all of the machinery and raw materials will be bought in the United States. Lists of equipment needed for several foundries to be erected in France by interests affiliated with the Tropenas Converter Co. are also being prepared.

The Southern Electro Steel Co., Scott Building, Lynchburg, Va., recently incorporated with a capital of \$200,000 to manufacture castings, and other iron and steel products, is planning for the erection of a foundry to be equipped for an annual production of about 2,500,000 lb. of steel castings and 3,000,000 lb. of ingot molds. A machining department to finish castings will also be operated. W. W. Ruble is secretary-treasurer of the company.

A report from Sydney, N. S., states that construction work on the plate mill was discontinued May 15, on instructions from the Dominion Iron & Steel Co. The McMahon Co. had the contract for the foundations and had about four weeks' work to complete it. It has been expected that part of the 250,000 tons of plate which has been contracted for by the Dominion Government would be turned out next fall.

Pickands, Mather & Co., Cleveland, have placed an order with the Ashland Fire Brick Co., Ashland, Ky., for the lining of the four stoves in the Toledo Furnace Co. plant, Toledo, Ohio.

The H. T. Shearer Machine Co., Waynesboro, Pa., has recently opened its plant No. 2 at Waynesboro, in which it is manufacturing bridge and boiler reamers

exclusively. The company has specially-designed machinery for the manufacture of these reamers and expects to raise its capacity to 600 reamers per day within the next 60 days.

Russell & Cox, representing iron, steel and brass goods manufacturers, formerly located in the Underwood Building, are now in their new offices in the Postal Telegraph Building, San Francisco. They have also added several additional offices in the Far West, and now have associate salesmen at Denver, Col.; El Paso, Tex.; Salt Lake City, Utah; Los Angeles, Cal.; Portland, Ore., and Seattle, Wash.

The Dearborn Steel & Iron Co., Chicago, has leased a four-story building on East North Water Street, with 100,000 sq. ft. of floor space. The larger part of the structure will be used for the storage of sheet steel, but in the middle of the year the company's offices will also be moved there. The building is well provided with shipping facilities, having a railroad on one side and a private water slip on the other.

For the purpose of attracting industries to Baltimore, the Board of Trade has organized an industrial Bureau, the work of which will be conducted by George C. Smith, prominent industrial expert. Mr. Smith is now secretary of the Cumberland Chamber of Commerce, Cumberland, Md., and will take up his new work in Baltimore on July 1.

The Peerless Drawn Steel Co., Massillon, Ohio, will shortly begin the erection of a two-story office building 84 x 44 ft. A gymnasium with shower baths and kitchen will be provided in the basement. Another two-story building will be erected, the first floor of which will be used as a garage and the second floor for a restaurant.

The John N. Willys Export Corporation has been organized by John N. Willys of the Willys-Overland Co., Inc., Toledo, O., to handle the export end of the Willys-Overland and Willys-Knight companies, as well as other of Mr. Willys' interests. Offices have been opened at 165 Broadway, New York. E. C. Morse is vice-president and general manager.

The American Steel Foundries Co. at Granite City, Ill., has closed its plant after a steady run of two years. Under normal conditions the company employs about 2000 workers, but the number of men recently has been gradually decreased until only 700 men were working when the plant closed.

The Weirton Steel Co. broke ground recently at Weirton, W. Va., for the first block of 500 new homes to be built by the company this year for incoming workmen. The company has plans made for the building of 1000 houses in Weirton after the first block has been completed.

The S. Snyder Corporation, recently chartered by S. Snyder and others, has purchased the entire interests of the Stein-Snyder Corporation, 14 Mart Place, Rochester, N. Y., wholesale dealer in scrap iron, steel and metals. Solomon Snyder is treasurer and manager.

The H. C. Frick Coke Co., Pittsburgh, has placed an order for 100 steel mine wagons with the Pressed Steel Car Co., of that city, to be built at its Koppel, Pa., works. The Frick Coke Co. has an inquiry in the market for 300 to 400 more steel mine wagons.

The Wheeler Condenser & Engineering Co., Carteret, N. J., in April manufactured and shipped 879,900 lb. of seamless drawn brass and copper condenser tubes. The company believes this is a record for one month.

E. T. Lippert Saw Co., Pittsburgh, has completed some large additions to its plant started in July, 1918, but delayed in building by reason of shortage in materials and labor. The company states no new equipment will be needed for the additions made to its plant.

The Center Foundry & Machine Co., Wheeling, W. Va., recently purchased ground in Warwood, W. Va., but states that it has no plans for the erection of a new plant in the near future. The concern makes iron castings and builds general machinery.

## American Society of Mechanical Inspectors Organized

Officers were elected and the first official publication of the new organization, the American Society of Mechanical Inspectors, came off the press last week, marking the active beginning of the society formed "to promote the science and general efficiency of mechanical inspection, along educational, technical and practical lines." To quote further from the constitution, "the principal means for the purpose shall be the holding of meetings for the reading and discussion of papers and lectures pertaining to the inspection of machined parts and materials; the distribution of its papers and discussion and the maintenance of an experimental laboratory."

A member must be a manufacturer, mechanical engineer, chief inspector, instructor, or an executive of equal standing, and in active practice in his profession for at least five years, and in an executive capacity for at least three years. The publication is entitled *The Inspector*, and is a 32-page monthly magazine, containing technical articles of educational value, news items of interest to the profession, illustrations and advertisements. Offices of the society are maintained at 35 West Thirty-ninth Street, in charge of H. F. Winter, secretary of the society and managing editor of *The Inspector*. There are 70 members as a nucleus, and when the publication is circulated among all the chief inspectors throughout the country a much larger membership is expected.

An officer of the society has defined the rather unfamiliar subject of mechanical inspection as follows: "It is the science of establishing standards whereby the uniformity of a product can be controlled as to size, strength, hardness, weight and quality so that the various parts or complete mechanism will properly perform the given functions." He added that it pertained to the metal-working industry only. The 15 founders were all members of the staff of the Wright-Martin Aircraft Corporation.

The following officers were elected May 22: President, Paul Theis, factory manager Fischer-Spring Co., Brooklyn, N. Y.; first vice-president, E. Mentor, technical supervisor C. E. Johansson, Inc., New York; second vice-president, J. Arthur Pineau, chief inspector Sperry Gyroscope Co., Brooklyn, N. Y.; third vice-president, Benjamin H. Gilpin, chief inspector Wright-Martin Aircraft Corporation; fourth vice-president, Herbert L. Bailey, service manager Chevrolet Automobile Co.; secretary, H. F. Winter, teacher of engineering subjects; treasurer, H. Ream Baker, sales manager without New York, S. W. Straus & Co., New York. Committees were appointed on standardization, meetings, publication, membership and finance.

Connected with the society will be free courses in mechanical inspection, both preliminary and advanced. There will be a different instructor for each subject. Arrangements have also been made with the Government for the training of soldiers and sailors, disabled or sound.

## Cement Manufacturers Combine

Ten Portland cement manufacturers, having an aggregate productive capacity of 14,000,000 bbl. annually, have joined in the organization of the Cement Export Co., Inc., a Delaware corporation, registered under the Webb act for the purpose of exporting cement. Invitations to participate in the new organization have been extended to all Eastern cement manufacturers, and it is expected that additional companies will join in the near future. The principal office of the company will be located in New York.

The Pittsburgh section of the Steel Treating Research Society held a joint meeting with the Engineers' Society of Western, Pa. in the auditorium of the Union Arcade, Pittsburgh, on Tuesday evening, May 20. T. D. Lynch, research engineer of the Westinghouse Electric & Mfg. Co., East Pittsburgh, read a paper on "Heat Treatment of Steel," and also gave interesting data on steel used for making shells. The paper was illustrated by lantern slides.

## Office Changes

A. E. Bundsen, vice-president of the Swedish Steel and Importing Co., Limited, with headquarters for America at Montreal, Canada, and manager of the Denver office for the corporation, was in San Francisco recently for the purpose of making arrangements to open a branch office and also to establish a warehouse in San Francisco to facilitate the transaction of its business on the Pacific Coast and to trans-Pacific markets. The new headquarters will be located in the Balboa Building.

The Union Drawn Steel Co., which has plants at Beaver Falls, Pa., and Gary, Ind., has opened a sales office at 608 Rockefeller Building, Cleveland, in charge of Fred C. Young, for several years representative of the company in Detroit. The Union Drawn Steel Co. manufactures cold drawn steel and maintains warehouses and sales offices at Detroit, Philadelphia, New York, Chicago and Cincinnati, and also maintains sales offices only in Boston, Buffalo and Cleveland.

The Fuller Engineering Co., Allentown, Pa., has opened an office at 25 Victoria Street, Westminster, S. W. I., London, Eng., with Leonard C. Harvey in charge. Mr. Harvey will act as European manager, giving his personal attention to assisting various companies in Europe which are acting as Fuller company agents in Great Britain, France, Italy, etc.

The Van Dorn & Dutton Co., Cleveland, manufacturer of gears, has opened branch offices at New York and Chicago, specializing in gears and pinions for electrical work. Harry F. Keegan, formerly with the Chicago surface lines, will manage the Chicago branch with offices at 1241 First National Bank Building. His brother, John Keegan, will manage the New York office at Room 317, 30 Church Street.

Lebanon Valley Iron & Steel Co., Lebanon, Pa., manufacturer of bar iron, machine bolts, carriage bolts, lags and nuts, has opened a sales office at 1319 Continental Building, Baltimore, in charge of G. L. Hoffa, who was for seven years with the sales department in the general office at Lebanon.

The Machinery Sales Agency, a subsidiary of the Western Machinery Co., Salt Lake City, has opened offices in the Balboa Block, San Francisco, under the management of J. P. Keller. The firm handles mining, milling and railroad equipment.

The McMyler Interstate Co., Bedford, Ohio, has opened an office in the Hoge Building, Seattle, Wash., in charge of W. R. Hendrey. The territory covered by this office includes the states of Washington and Oregon and the northern part of Idaho.

The Lutz Co., Philadelphia, manufacturing machinist and founder, has occupied a new office building and plant at Morris and Bamberg streets, that city. A formal opening of the new building was held on May 6.

The Deferral Tool & Alloy Steel Corporation announces the removal of its general and executive offices to the seventeenth floor of the Woolworth Building, New York.

About June 1, the offices of the Niles-Bement-Pond Co. will be removed from the Frick Building, Pittsburgh, to the Stevenson-Foster Building on Seventh Avenue, in that city.

The Pittsburgh sales offices of the Valley Mold & Iron Corporation, Sharpsville, Pa., are now located in rooms 508-9 Oliver Building.

The Tacony Steel Co., Tacony, Pa., has opened a Cleveland office in the Swetland Building under the direction of W. W. Keefer, as district sales manager.

## New British Steel Extras

A new list of extras on finished steel went into effect in Great Britain on May 1.

Plates  $\frac{3}{8}$  in. thick up to and including  $1\frac{1}{2}$  in. thick take the base price. Plates  $1\frac{1}{8}$  in. thick carry an extra of 10s. per ton or 0.109c. per lb.; plates  $1\frac{3}{8}$  in. thick carry an extra of 0.217c. and plates 2 in. thick carry an extra of 0.326c. A plate  $5/16$  in. thick carries an extra of 0.059c. per lb. and a  $\frac{3}{4}$ -in. plate 0.109c. For circles and sketch plates the extra is generally 0.543c.

For each thickness of plate there is a base width and an extra is charged for width over this minimum. For example, a  $\frac{3}{4}$ -in. plate carries no extra when 60 in. wide, but for every 3 in. or fraction over this width the extra is 0.027c. The width extra is the same for all plates, but the extra is not applied until the minimum width is exceeded. For example,  $\frac{1}{2}$  in. may be 90 in. wide before the extra width can be figured; a  $9/16$ -in. plate, 96 in., etc.

Extras are also levied for weights. Over 4 gross tons and including 4 t. 5 cwt., the extra is 5s. or 0.054c. per lb. An additional extra of the same amount is added for each increment of 5 cwt. until 6 tons is exceeded, the extra for weights over 5 t. 15 cwt. and including 6 t. being 0.434c. per lb. The extra for every 5 cwt. then becomes 10s. or 0.109c. per lb.

For a guarantee of welding or flanging quality the extra is 0.109c. per lb.

Plates for shipbuilding specifications are subject to an extra of 10s. per ton or 0.109c. per lb. Extras are applied for limiting the range of tensile strength and for high tensile strength. For example, where the range is  $3\frac{1}{2}$  to 4 tons per sq. in. (8000 to 9000 lb.) the extra is 0.109c. per lb., but where the range is 2 to  $2\frac{1}{2}$  tons (4500 to 5500 lb.) the extra is 0.434c. per lb. The guaranteed elongation that may be given without extra is 20 per cent on 10 in. or 22 per cent on 8 in.; anything over is charged at 0.109c. extra. A high tensile quality of say 66,000 lb. to 77,000 lb. carries a 0.217c. extra and one of 78,000 to 90,000 lb., a 0.76c. extra. Where no tensile tests are specified, extras are provided for the carbon content stipulated. Extras are also named for flattening; for narrowness, such as 12 and 15 in.; for smallness, under 4 sq. ft. in area; for surface inspection, 0.054c.; for pickling survey; for annealing, 0.326c., and for oiling.

A long list of extras is given for plates under  $\frac{3}{4}$  in. in thickness, and for steel angles, bulb angles and other sectional material. Angles of 7 in. up to and including 11 united inches (including 6 x 6 in.) by  $\frac{3}{8}$  in. and upward take the base price.

Rounds and squares 3 in. to  $5\frac{1}{2}$  in. take 12s. 6d. per ton or 0.136c. per lb. over the angle base. The hexagon base is 30s. or 0.326c. per lb. over rounds. Rounds and squares under 3 in. down to and including  $\frac{5}{8}$  in. take 50s. per ton over the angle bases or 0.543c. per lb. Hexagons under 3 in. to  $\frac{5}{8}$  in. across the flats carry 70s. or 0.76c. per lb. The so-called angle base is the base for sections and includes 9 to 12 united inches in a bulb angle,  $\frac{3}{8}$  in. thick and up. Each channel or beam carries an extra over this base depending on its dimensions.

## German Pig-Iron Prices and Production

As the Prussian minister of commerce refused to sanction the considerable increases in the prices for coal and coke by the Westphalian Coal Syndicate as from April 1, the pig iron syndicate has been compelled to modify the higher charges which had also been resolved upon as from that date on the basis of the then expected advance in coke. The abandonment of this proposal, the syndicate states, represents directly and indirectly a reduction of 40.50 to 48 marks (\$9.75 to \$11.50) per ton in the cost of producing pig iron.

The syndicate has also expressed its readiness to grant a large reduction in the prices of all sorts of pig iron in order to assist the authorities in their endeavor to bring about a speedy and general fall in prices. But as an advance has now been made in the prices for Nassau red iron ore, this fact has to be taken into con-

sideration, and thus the amount of the increases recently decided upon becomes reduced 55 marks per ton for hematite, 57 marks for Nos. 1 and 3 foundry iron, 60.5 marks for Siegerland steel making iron, 73 marks for spiegeleisen, and 60 marks for Luxemburg foundry iron. The prices at makers' works are consequently as follows, as from April 1, counting a mark equal to 23.8c.:

Hematite .....	366.50 m.	\$87.23
No. 1 foundry iron.....	340.00 m.	80.92
No. 3 foundry iron.....	339.00 m.	80.66
Siegerland open-hearth pig....	303.50 m.	72.23
Spiegeleisen .....	331.00 m.	78.78
Luxemburg foundry pig.....	296.50 m.	70.57

The Syndicate adds that with these reductions as compared with the increases which had been decided on the new prices throughout are lower than the costs of production, and the furnaces continue to be worked at a loss.

The Association of Iron and Steel Producers announces that the output of pig iron averaged 17,611 tons daily in March, as compared with 16,757 tons in February, and 16,168 tons in January. The total for March was 545,939 tons, making the output for the first quarter 1,516,356 tons. This compares with 4,614,912 tons in the first quarter of 1914 and with 3,229,245 tons in the first quarter of 1916. The amount of the production in March included 64,396 tons made in the occupied districts, and, therefore, not available for German consumption.

## France Lifts Embargoes

WASHINGTON, May 27.—The French Government has swept away some of the most important embargoes which it had imposed on the importation of raw and semi-finished materials. Effective May 25, the ban was lifted on the following items, according to a cablegram received by the Bureau of Foreign and Domestic Commerce:

- Foundry pig iron and forge pig containing less than 15 per cent of manganese.
- Spiegel iron having 15 to 25 per cent of manganese.
- Wrought iron and steel, crude, in ingots.
- Iron or steel rolled or forged into blooms, billets and bars.
- Iron or steel rolled or forged into bars of 3 mm. or less in their thinnest parts, moldings plain or decorated, iron worked in intermittent relief.
- Iron or steel rods (for wire and nails).
- Hoop iron or steel, hot rolled, 1 mm. or more in thickness.
- Hoop iron or steel cold rolled.
- Sheets of iron or steel.
- Sheets of nickel or steel, cut or not.
- Hot rolled plates, known as "larges-plates" of more than 20 cm. in width and of more than 2 mm. in thickness.
- Iron, tinned (tin plate) coated with copper, lead, or zinc.
- Wire of iron or steel, whether tinned, coated with copper or zinc, galvanized or whitened or not.
- Waste and scrap iron which can be utilized only for remelting.
- Scrap of tin plate, of a thickness of 5 mm. or more.
- Slag and scoriae.
- Copper, pure or alloyed with zinc, tin, aluminum or manganese, except ore.
- Lead, tin, zinc, nickel, antimony, excluding ores.

The official removal of the restriction is made by reference to sections of the French customs tariff act. This accounts for the technical detail of some of the classes released from the embargo. Machinery is still on the restricted list.

The German Steel Federation, recently organized, will deal with questions of a fundamental character, with the authorities and consumers, and also with representatives of the workmen. It will promote the establishment of syndicates and protect the existing syndicates, pursue the common economic aims of the constituents in the home market and abroad, and particularly pay attention to the advancement of sales.

Jones & Lamson Machine Co., Springfield, Vt., has added A. B. Galco, Ltd., Stockholm, Sweden to its list of foreign agents.

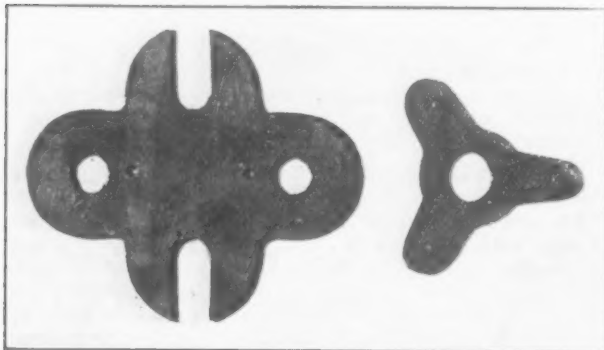
## Machine for Duplicate Sheet Steel Parts

A machine for the manufacture of duplicate sheet steel parts is announced by the Oliver Instrument Co., Adrian, Mich. The machine is built on the lines of a punch press, with a deep throat and a short stroke. The punch used is round and has a heel on the back which does not raise out of the die when the machine is in operation. There is an eccentric bearing in the head, by means of which the punch can be raised  $\frac{3}{8}$  in. When in this position the work will pass under the punch and can be set in position to work out a hole in the part. A templet is first made to exact shape of the part desired. This templet is doweled to a piece of sheet metal and the excess metal cut away by the punch.

The stroke is so proportioned that the punch clears only the stock and cuts into the metal until the templet rubs against the body of the punch. The work is guided by hand, keeping the templet against the punch until the entire outline has been cut out. If the part has openings a hole is drilled which will admit the punch. An eccentric bearing on the head of the machine permits the punch to be raised clear of the die a sufficient distance to insert the work and the punch is lowered through the hole. The machine is



Rapid Operating Profiler for the Manufacture of Duplicate Sheet Steel Parts. A templet is first made to the exact shape of the part desired and is then doweled to a piece of sheet metal, after which the excess metal is cut away.



Specimens of Work Indicative of the Capabilities of the Profiler

then started and the hole worked out the same as though it were an extension surface.

It is pointed out that it is impossible to overrun the finished outline and the work comes from the machine practically finished, as it is only necessary to remove, by filing, the small scallops left by the punch.

The machine is motor driven and has an interlocking switch and brake arranged in such a way that the

machine runs only as long as the foot is on the pedal. The speed is 250 strokes per min., the stroke is  $\frac{1}{4}$  in. and the machine will work steel stock up to  $\frac{5}{32}$  in. thick. The total weight of the machine is 601 lb.

## Java in Quest of American Machinery

American machinery, the sale of which was greatly augmented in Java and the neighboring islands by the war, will be in still more demand, according to K. F. Van den Berg, special commissioner for the Government of the Dutch East Indies, who is now in New York. He may be found in the offices of the Government of the Netherlands, Colonial Department, Room 2033, No. 17 Battery Place.

Mr. Van den Berg was sent to this country to bring about closer commercial and financial relationships between the United States and the Dutch East Indies. Before the European conflict there had been little direct trade between the Dutch Archipelago and America, owing to the fact that most of the commercial intercourse was along the indirect routes, by way of London, Hamburg and Rotterdam. The general disturbance of commerce brought about by the struggle with Germany disrupted this arrangement and the people of the Dutch East Indies, whose Government is now financially independent of that of Holland, welcomed direct dealings with New York, Philadelphia, and Boston, because thereby they were saved time and expense in transshipment. As there are no preferential tariffs on imports, goods from Dutch ports paying the same duties as do those from other nations, and as the average of such duties on foreign merchandise is only 8 per cent, Mr. Van den Berg believes that the opportunities for American trade will be of great benefit to both this country and the East Indies.

The islands in the Indian Ocean have large quantities of raw materials which they would be glad to market in this country, so that they may build up a reciprocal trade through which they may purchase machinery for developing their resources and iron and steel of all kinds.

"Iron and steel products," said Mr. Van den Berg, "now constitute the principal items which are imported by the East Indies. There is every indication that this demand, which already constitutes one-quarter of the entire imports, will be greatly increased, and that American machinery and metal materials will be especially in request, now that the people of the islands are learning more about them."

"The opening up of the islands of Sumatra and Celebes will lead to the construction of railroads, the material for which will have to be imported. Several of the larger cities of Java are now making extensive municipal improvements, and new water works and sewers mean large quantities of cast-iron pipe. American manufacturers of such pipes should be able to find in Java an opportunity to dispose of a considerable stock. The municipality of Batavia will soon be calling for tenders for the delivery of 20,000 tons of iron and steel tubes. Sourabaya will require some 9000 tons; Djokjakarta some 5000 tons, and Semarang probably will have to order double that amount of such tubes and pipings as the United States is in an excellent position to supply."

He sees another important opening for American machinery in the Dutch East Indies through the recent discovery of large iron ore deposits in the Verbeek Mountains of the Island of Celebes.

These ores, according to the report of the Chief of the Bureau of Mines in the Dutch East Indies, belong to the same class as the well-known Cuban ores. There is considerable nickel associated with them.

The development of mining in the East Indies will be much helped by electrical machinery, and as there is much power to be derived from numerous waterfalls. Mr. Van den Berg believes that manufacturers of dynamos and similar appliances will find ample opportunities for extending their business.

The biggest single purchaser of American tin plate in March, 1919, was Japan. It received 16,260,539 lb., valued at \$1,653,300, out of a total export in that month of 55,505,977 lb., worth \$4,997,846.

## CORRESPONDENCE

### Maintenance, the Great Need of the Hour

*To the Editor:* The United States is shabby. For four years every energy has been directed to meet war conditions and now that hostilities are over common sense demands that we frankly recognize the state we are in and take measures to correct the present unusual and dangerous condition.

There are three main classes into which expenditure may be divided. Money is spent for construction, for operation, and for maintenance.

Ever since the first war contract was received from the allies, and especially since we ourselves entered the war, the amount of construction in this country has passed belief. Factories and ships have been built literally and actually "by the mile." Similarly the sums spent for operation have established new records due to the amount of work done and the quantities of goods manufactured at universally high prices of labor and materials.

Maintenance, however, has been everywhere neglected, nor is it surprising considering the necessity that existed for devoting every dollar of money and every ounce of energy toward meeting the demands created by the war.

The fact remains, nevertheless, that everything has run down. Furthermore this deterioration has taken place at a rate far beyond normal, on account of the greatly accelerated pace at which we have carried on our activities. Now we must pay the piper, by making good the wear and tear of the last four years, and it behooves us to do it at once, for putting off maintenance is costly business. This is so because deterioration of plant does not progress in an orderly way, but in a most unseemly fashion. The reason for this is, that lack of care leads to need for repairs. Lack of repairs leads to need for replacements. Lack of replacements leads to ruin. The sequence is clear and certain. The care might cost a dollar; the repairs ten dollars; the replacements a hundred dollars, and the ruin, a thousand.

During the stress of the war there has been but little time or labor available for "care" and furthermore much labor was new to its job and did not know how properly to look out for the equipment entrusted to it. When repairs were needed they were often slighted under the pressure of other work, and finally replacements were deferred on account of lack of time or help, or the impossibility of shutting down the plant to do the work or perhaps the impossibility of getting the articles needed.

### Cost of Waiting for Hoped For Low Prices

In consequence of all this the country is shabby and the industries and manufacturing plants face a heavy bill for deferred maintenance. Instead of meeting the situation there is a regrettable tendency to put off the inevitable. This is in part due to the feeling that prices for labor and material are now so high that they must soon fall, and then the work can be done more reasonably. This is poor judgment. It is doubtful if prices are going down materially, if at all; they may even rise. In the meantime while waiting for the expected, or hoped for drop in prices, the deterioration of plant is progressing apace, generally at a rate that more than offsets any possible fall in the cost of labor and materials.

The wise manager is the one who immediately inaugurates a maintenance and repair campaign, who spruces up his plant and overhauls the machinery from end to end.

It will be a good plan to carry out all postponed work, particularly that requiring labor. Do this with enlisted men of the Army and Navy and give yourself the opportunity later to select the best ones for your permanent force as business improves. The demobilized soldier and sailor are the "best buy" in the labor

market today. They are tried men. The Army and Navy got rid of the undesirables.

At the present time it is likely that there are more jobs than there are men. What unemployment there is is due to difficulties of adjustment and will shortly disappear. It is well to remember that there has been no immigration for five years, and that there will probably not be any to speak of for five years more. That means eight million less workers in this country than if there had been no war. A shortage of labor in the near future is almost inevitable. Therefore the wise man will immediately start in to do all work postponed by the pressure of wartime conditions, such as carpentering, painting, roofing and other similar work on buildings and structures. It will also be well to replace worn parts of small machines and repair all machinery strained by war work. Furthermore, make all postponed routine extensions in buildings and equipment.

It is not to be expected that all men will agree at once that high prices are here to stay. Consequently many will hesitate to build for investment. However, no sane man will let this opportunity go by to "put his house in order", especially as losses from not doing so will be far greater than any saving gained by waiting, even should prices fall somewhat.

ELIHU CUNYNGHAM CHURCH,  
Major, General Staff, U. S. Army.

### Payment Arrangements in Export Business

*To the Editor:* Although we thought we knew something of export business, we have learned of and now fully appreciate the peculiarities inherent in this field. We were formerly most devoted to that worst enemy of the export trade, "Cash against documents before leaving the factory." The abandonment of this policy has multiplied the volume of our business in those quarters one hundred fold.

As of possible interest to others seeking this field, we will say that our experience in this country proved to us that "net cash 30 days" was the greatest joke of the century. The truth is that the customer has your goods and pays for them when he is good and ready. Of course you have the satisfaction of knowing that your goods are still under the same particular portion of the skies as those you see every day, but the fact remains that you are financing your customer 75 times out of a hundred.

On the other hand by means of the usual terms, the export customer is really financing you, and, strange to say, he is most of the time your biggest customer. Why not, therefore, treat him like your immediate neighbor. This is what we are doing, to our great benefit.

The time spent in customs formalities and in hauling to the new factory will be almost the same as the average time it takes here for goods to reach the customer by freight from the seller's plant, hence from the day of arrival at the foreign seaport, we apply our usual terms, same as in this country. There is however a big difference. Foreigners know what acceptances are, while here most people hardly even understand the word.

If we sell a man, say, in Brazil 30 days from date of arrival, we make out an acceptance on the day of sailing, and attach it to the shipping documents. The bank obtains signature at destination, and we have immediately secured thereby a perfectly liquid form of our account collectible. This shows that actual payments will average 60 days, while in this country they average nearer 90 to 120 days.

We realize that these terms, while perfectly suitable to our business, may not be applicable to others, but when one considers all the material entering into the erection of a complete steel foundry he will agree with us that the variety is great and that the plan outlined above may yet be of service to others.

G. MUNTZ,  
Vice-president and general manager,  
Tropenas Converter Co.

Brooklyn, N. Y.

ESTABLISHED 1855

# THE IRON AGE

EDITORS:

A. I. FINDLEY

WILLIAM W. MACON

GEORGE SMART

CHARLES S. BAUR, *Advertising Manager*

Published Every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

W. H. Taylor, *President and Treasurer*

Fritz J. Frank, *Vice-President*

George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Chas. G. Phillips, *Vice-Pres.* W. H. Taylor, *Treas.* A. C. Pearson, *Secy.*

Cincinnati: Mercantile Library Building. Washington: 613 Fifteenth Street, N. W. San Francisco: 320 Market Street.

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: Guardian Building.

Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, \$5.00; Canada, \$7.50; Foreign, \$10.00 per year. Single copy, 20 cents.

Entered as second class matter, June 13, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

## Wages and Steel Prices

Labor organizers and existing labor unions show a disposition to offer a species of co-operation with the iron and steel producers that was not invited. Whether or not as a direct result of the widely made statement on behalf of the steel industry that it could not afford to reduce its selling prices without reducing wages, the Amalgamated Association convention at Louisville formulated a wage scale to be presented to the sheet mills for the twelvemonth beginning July 1 which fixes the minimum of the scale at 4.35 cents as the average realized price on shipments of 26, 27 and 28 gages. As the present recognized market price is 4.35 cents for 28 gage the minimum of the scale would be above the market, since 27 and 26 gages sell at discounts from the 28 gage price. The existing minimum in the sheet scale is 1.80 cents. In a declining market wages would decrease until 1.80 cents was reached, and if the market declined below that level there would be no further decreases. If the Louisville convention scale were adopted, wages would be pegged and if the sheet mills should reduce prices of sheets they would be doing so exclusively out of their own pockets.

On Sunday a meeting was held in Pittsburgh of delegates from various local unions to supply material for formulating a general report on organizing the entire steel industry, for presentation at the annual convention of the American Federation of Labor, to be held June 6 at Atlantic City. If not definitely expressed, there will be the idea by implication that the iron and steel manufacturers are in position to pay existing wage rates and that all they need to do to continue in that position is to avoid spilling the beans by allowing prices of their finished products to sag.

Just what attitude the American Federation of Labor will assume at the Atlantic City convention cannot be predicted, but it is readily recalled that for some time past, during and since the war in other words, there have been suggestions on the part of labor leaders that workmen have a right to pass upon the propriety of prices at which the employers sell the joint product. This is a dangerous doctrine, and it is made all the more dangerous through the possibility of manufacturers being found who regret so deeply that the law does not allow them to agree with com-

petitors upon selling prices that they may look kindly upon this suggestion. There is a specious argument that if wage rates are made contingent upon the continuance of certain selling prices and workmen are unwilling to accept reductions, the employer is kept in the position of being unable to reduce his prices, since to reduce prices might be to provoke a strike.

The contention made at various times in recent months that the maintenance of steel mill wages hinged upon the maintenance of steel prices was a perfectly fair and sound one for the circumstances to which it was applied by those who used it; but once such a doctrine is enunciated there is nothing to prevent labor leaders and labor unions from giving it the application that suits them. It should be pointed out furthermore that when the argument was made it was not presented in the spirit that the manufacturers were willing or anxious to make the combined reductions of prices and wages. They knew quite well that if anything of the sort were to be attempted it would result in selling prices being reduced by amounts greater than the saving in wage cost, so that their margin would be reduced.

The proposal that workmen be given a place in the counsels of their employers has come to the front and is quite unlikely to be downed. It is time that the precise nature of that participation should be more clearly indicated. Participation in discussions of selling policies should be the least; participation in discussions of working conditions and methods of operation should be the greatest. The mill manager is not usually consulted when sales policies are mapped out; and if not, why the men who are under him? Yet one can easily discern trends in that direction at the present time.

## Providing New Finishing Capacity

It will be some time before the construction of new steel capacity in the United States will be a live issue. In the five years ending with 1918 steel ingot and castings capacity in this country was increased from 35,000,000 to 49,000,000 gross tons. The margin of capacity over the 1918 output, which was achieved under the enormous pressure of war necessity, is about 5,500,000 tons. That the output in 1919 will be much below that

of 1918 goes without saying. But the fact that steel-making capacity is ample to-day and is likely to be ample for many months does not mean that no new construction work by steel companies is to be expected this year. The urgent necessity for increased steel output for war purposes led to the building of many new open-hearth furnaces and blooming mills, but in the midst of the war there was no time to consider the balancing up of ingot and blooming mill capacity with the proper amount of finished capacity. There is now before various companies the question of providing finishing mills in lines in which demand is likely to expand under peace conditions. Plans for some of this work are now under way, and it is to be expected that first and last a considerable amount of finishing capacity will be provided in the coming year.

### The Spur of Unused Floorspace

The patent attorneys of the United States were never so busy as now. During the war this branch of the law languished. Manufacturers had no time to spare for inventions and development of design; in consequence the Patent Office had comparatively few applications, and what there were related largely to the mechanism of war. Today ideas which had to be put aside in wartime have been picked up again and a great stimulus has been given to invention. A like development has always followed a period of great industrial activity. When the pressure for production has been curtailed, the inventor and designer come into their own. The year 1907 was a striking example, but not so striking as 1919. Never have manufacturers been confronted by a problem so great as that now before them, of providing means for utilizing plant capacity that had suddenly expanded to unheard of proportions.

The effort to create new demand takes two forms—one to improve existing lines, so that a plant may take a larger share than formerly of the market, the other to add new lines. In either case the inventor and designer and the patent lawyer are necessary factors. Never has the man with an idea found it so easy to get a hearing.

Just as the imperative needs of war caused a tremendous development of military materials and enginery, so the incentive of today should produce extraordinary advances in the products of peace. No better spur to a manufacturer's ambition can be found than that of the vacant floorspace and idle equipment which as a burden charge threaten to eat into profits.

### Heat Treatment as a Science

Of associations in engineering and business there seems to be no end. In recent years so many technical organizations have sprung up that it has been a question whether there are not too many. Yet in almost every case the work of a new society has soon justified its creation.

In recent months an organization has been born which has already assumed national scope. From the mother organization in Chicago, the American Steel Treaters' Society has spread until

there are local chapters in New York, Philadelphia and a half dozen other cities. It has already set on foot a broad program. A national convention and exhibition are announced for Chicago late in September. A journal has been published for several months. And now it is probable a national research laboratory will be organized to further impartial research for the benefit of members and to advance the interests of the society.

Probably less is known to-day about the heat treatment and hardening of steel of all kinds than about any other phase of the manufacture and use of steel. Many of the present methods are out of date and the cause of much loss to users of important steel parts. Good steel is being ruined daily by careless and inaccurate heat treatment. Many examples could be cited. The increasing number and importance of alloy steels is further complicating the situation. In view of the striking progress lately made, not only in pyrometric measurements but also in the control of temperature by electric, gas and oil-fired heating furnaces, the new movement for co-operation in applying the scientific method should yield large returns in increased certainty of results and in definite improvement of product.

### Beehive and By-Product Coke

The very small production of beehive coke shown by the last weekly report of the Geological Survey should not be taken as indicating merely a yielding of the beehive process to the by-product process when there is not enough demand to keep all equipment in operation, for there is also to be taken into account a large decline in the consumptive demand for coke. The output of the by-product coke ovens has undoubtedly decreased very considerably, but the decrease is not as great as that in beehive coking.

The report showed an output of 209,975 net tons of beehive coke in the week ended May 17, against 260,478 tons one week earlier, 318,630 tons five weeks earlier, 429,446 tons ten weeks earlier and a maximum of about 675,000 tons in two or three particularly good weeks in 1918.

The decline in pig iron production has not been in any such proportion, of course, yet it has been very extensive. As shown by the monthly blast furnace report of THE IRON AGE, the daily rate of coke and anthracite production in March was 99,685 tons, declining to 82,607 tons in April. A corresponding percentage decrease would make the rate of operation of furnaces using coke about 25,000,000 tons a year, at the middle of May. Normal average coke consumption is about 2285 lb. per ton of iron, which would mean coke consumption by blast furnaces at the rate of about 28,560,000 tons a year, and as the blast furnace consumption normally runs close to 80 per cent of the total coke production, the latter would seem to have been proceeding at the rate of about 35,700,000 tons a year. The output of beehive coke of 209,975 tons in the week ended May 17 represented a rate of 10,900,000 tons a year, which would leave 24,800,000 tons a year for the by-product ovens.

It is unfortunate that it has not been possible to report the by-product output since production began

to trend downward, but the Geological Survey's weekly reports were continued long enough to indicate that the maximum rate attained was in the neighborhood of 30,000,000 tons a year. The estimate of 24,800,000 tons a year just made as the productive rate at the middle of May is probably a trifle beyond the mark, as it is based on average coke consumption in 1916, when all furnace capacity was in operation. The furnaces operating in May doubtless included an abnormal proportion of furnaces having particularly low coke consumption. Thus it may be said, roughly, that by-product coke production has decreased by more than one-sixth, while beehive coke production has decreased by fully two-thirds.

Since the by-product process is by far the cheaper, it might be asked on economic grounds why there should be any beehive coke production as long as there is by-product coking capacity to spare. The reason is largely a commercial one. Only in exceptional cases have the by-product coke producers had opportunity to sell surplus product, as the furnaces using purchased coke were tied by contracts for beehive coke, running as a rule to July 1. This point raises the interesting question whether any of the by-product producers will endeavor to sell their coke on contract for the second half of the year. The usual contracting period for the furnaces tributary to the Connellsville coke region has arrived. Should the by-product coke companies be unwilling to tie themselves by six-months' contracts, on account of expecting larger demand on the part of their own furnaces, and should offer monthly supplies instead, the furnaces that buy coke would have a difficult question to settle. If they bought the by-product coke for the time being, they would face the possibility of having to switch back to beehive coke at a time when improving conditions would make the beehive operators very stiff in their views as to prices.

### Germany's War Steel Output

The secrecy maintained regarding Germany's war output of iron and steel since October, 1916, was recently broken and an analysis of the production reveals some striking features. In steel of all grades Germany reached her maximum output in 1913 at 18,894,241 metric tons. The largest war production was in 1917 at 16,587,360 tons. At no time during the war did the flow of steel from German furnaces approach the peace production, despite the fact that there were attempts to make the Allies think that records were being made. It is a fact that the coal production, on which munition makers and steel plants depend, was about 2,500,000 tons per month less than in peace time, while the war output of coke was equal to the peace output; but those well informed knew that the country could not maintain a pig-iron and steel production equal to the pre-war rate. Under the conditions, therefore, the production of over 16,500,000 tons was no mean achievement. In the 10 months ended with October, 1918, the output was 13,756,813 tons, and if this rate could have been maintained for the other two months the year's production would have been over 16,500,000 tons.

By no means was the same ratio in pig-iron

output maintained as in steel. As compared with over 19,300,000 tons in 1913, the largest war production was 13,284,738 tons in 1916. That it was possible to augment so greatly the steel output under war conditions is probably explained by the use of large amounts of scrap taken from Belgium and France in the shape of broken machinery and iron and steel in all manner of forms.

Comparing the 1917 steel output with that of 1913, it is notable that the Bessemer basic output declined over 33 per cent, due perhaps to a lack of pig iron. The open-hearth production was maintained at more than the relative normal peace output or 7,270,000 tons as compared with 7,600,000 tons in 1913. In crucible steel there was a marked increase relatively, and here scrap steel was probably also an important item. The expansion from 1913 to 1917 was over 30 per cent. But the striking changes are in the electric steel and the steel casting output. The 1917 electric steel production was over twice that of the 1913, when Germany led the world in the use of the electric furnace. In steel castings, however, the growth was remarkable under war conditions, the 1917 output having been over five times that of 1913, or 1,495,000 tons against 298,000 tons. The extent of this expansion is appreciated when it is remembered that the German steel foundry output in 1916, 1917 and probably 1918 exceeded that of the entire United States each year. To what extent the supply of stolen scrap was a factor in the electric and steel casting output is not known, but it was probably important.

Perhaps never again will Germany occupy second place in the world's steel and iron production. The elimination of Alsace-Lorraine and Luxemburg means a drastic curtailment in the amounts credited to Germany and the quantity that will be unavailable for inland consumption as a result of the appropriation of German territory is by no means small. According to data already published for January and February, the present German output, excluding Luxemburg and Alsace-Lorraine, is at the rate of only about 500,000 tons per month of pig iron and steel respectively. If from this is deducted the quantity produced in the occupied areas, the German steel output is at the rate of only about 5,600,000 tons per year and that of pig iron only 4,800,000 tons per year.

As a result of the war, then, Great Britain occupies second place in the world's steel and iron output, and it is probable that France, soon after her rehabilitation, will not only out-rank Germany but push hard for the second position in the world's great industry. Surely the proud prestige of Germany in steel and iron has suffered a stupendous blow.

The Salvage Board, St. Louis district ordnance office, 613 Locust Street, St. Louis, will receive sealed proposals for the purchase of 3769 tons of cast steel ingots for 240 mm. common steel shells, basic open-hearth, manufactured by the Scullin Steel Co., St. Louis, up to 11 o'clock a.m., June 10. The analysis follows: Carbon, 0.45 to 0.63; manganese, 0.50 to 0.90; phosphorus, 0.06 not over; sulphur, 0.06 not over; silicon, 0.10 to 0.35. Inspection may be made before the date of sale at the Scullin Steel Co. Quotations must be per net ton, f.o.b. cars, plant Scullin company.

## ADJUSTING CONTRACTS

### Business Men Carry on the Work, Which Is Nearing Completion

WASHINGTON, May 27.—The first formal report made by Benedict H. Crowell, Director of Munitions, on the adjustment of war contracts lists 15,756 settlements out of the 24,199 contracts which were curtailed by the armistice. Agreements are in sight on 2,500 more. As the contractors have until June 30 to file claims, it is possible that the list will grow. The various boards are still at work on the adjustments and it is expected that the task will be completed in August.

Out of \$6,000,000,000 worth of contracts affected by the armistice, a total of \$3,600,000,000 of eliminations were ordered. The claims for these suspensions and curtailments total approximately \$700,000,000 on which the awards to date are \$153,476,000.

"From my survey of the work," says the concluding paragraph of Mr. Crowell's report, "I am impressed with the spirit of co-operation and fair dealing evinced generally by the contractors affected. They seem to be carrying over into this final winding up of their war relations with the Department to a marked degree the admirable spirit which they so generally displayed in the stress of the nation's military need."

In summarizing the report, Mr. Crowell says:

"In considering the amounts paid in settlements which have already been approved and those which it is estimated will have to be paid on account of contracts under which performance has been curtailed, it must be remembered that in the course of these settlements the Department is taking over considerable quantities of material and equipment and various plants. The value to the Government of this material and equipment can only be determined as the result of salvage operations, but it is undoubtedly substantial.

"The work of contract adjustment has been and is being carried on by organizations essentially civilian in character. Business men of standing have remained in the service as officers or civilians to carry on this work in Washington and in the various localities where settlements are being negotiated. They have developed organizations adequate to handle this task which is unique in the history of the department. In spite of the difficulties to be overcome, I feel that more than 75 per cent of the actual work to be done is behind us. The organization is composed of men whose personal interest demands their speedy return to their normal occupations. There is, thus, every incentive to expedition, but there is throughout the organization a very clear determination not to sacrifice thoroughness and sound business judgment to undue celerity, and to clean the task up in a way that will be satisfactory to the country before leaving the service. Individual instances of delay, individual instances of hardship, individual instances of error are bound to be present in a work of this magnitude, but I feel that the principles which are being applied are sound and that the organization charged with this work is hard-working, competent and of absolute integrity and that the task is well on its way towards accomplishment."

Mr. Crowell, who acted as secretary of war during the absence of Secretary Baker, has sailed for France to confer with the army authorities overseas.

### The New Ontario Steel Project

TORONTO, ONT., May 27.—Further particulars are available regarding the new steel industry planned for Goderich, Ont., to be known as the Lake Huron Steel Corporation, with a capital stock of \$15,000,000. J. J. Mahon, Newark, N. J., who was the steel expert for the Imperial Munitions Board, confirmed the news of the plans. It is understood that he will be vice-president of the company and in active charge of the practical side of it. The corporation expects to start work on its plant within two months. Though ultimately it is intended to carry the manufacturing process right

## CONTENTS

May Meeting of the American Iron and Steel Institute Banquet Speeches by the Leaders—Judge Gary on War and Business—Electrically Heated Soaking Pit—The Standardization of Ship Materials—American Bridge Company's Forge Plant—The Bureau of Standards and Industrial Research—The Great Coke Plant at Clairton—Non-Metallic Impurities in Steel—Charging Raw Material Into Blast Furnaces—Record of American Steel in War—Discussions.....	1415-1436
Tunnel Type Japanning Oven.....	1440
A Morgan Bar Mill for France.....	1440
State of Blast Furnaces in Belgium.....	1440
Manganese Steel in the War.....	1440
Continuous Milling Machine.....	1441
Meeting of Association of Employment Managers.....	1442
Bar Mill Reclaims Butt Ends.....	1445
Combination Grinding Machines.....	1446
Heavy Duty Planer.....	1447
American International Corporation Consolidates Its Machinery Interests.....	1447
Cylindrical Work Grinder.....	1448
Exports of Machine Tools.....	1448
Solving the Housing Problem.....	1449
American Steel Treaters' New York Meeting.....	1449
Foreign Trade Convention at San Francisco.....	1449
May Cancel Plate Mill Contract.....	1450
Director Hines Criticizes Steel Prices.....	1451
Shell Contract Commission Suit.....	1452
American Society of Mechanical Inspectors Organized.....	1454
New British Steel Extras.....	1455
German Pig-Iron Prices and Production.....	1455
France Lifts Embargoes.....	1455
Machine for Duplicate Sheet Steel Parts.....	1456
Java in Quest of American Machinery.....	1456
Editorials:	
Wages and Steel Prices—Need of New Finishing Capacity—The Spur of Unused Floor Space—Heat Treatment as a Science—Beehive and By-Product Coke—Germany's War Steel Output.....	1458-1460
Iron and Steel Markets.....	1460
Adjusting War Contracts.....	1461
National Hardware Association Meeting.....	1461
Weirton Steel Co. Plans.....	1462
Government Completing Machinery Appraisal.....	1462
Aircraft Standardization Committee Going Abroad.....	1462
William Salomon & Co. Acquires Control of Otis Steel.....	1462
Labor Situation:	
Steel Corporation to Continue Its Open Shop Policy—The Amalgamated Association Asks Higher Rates—Worcester Strike Continues—In the Labor World.....	1475
Non-Ferrous Metals.....	1477
Personal.....	1478
Obituary.....	1480
Youngstown Pressed Steel Co. Will Build New Plant.....	1480
Convention of American Iron, Steel and Heavy Hardware Association.....	1481
Agreement on Hours in French Metallurgical Industry.....	1482
The Bethlehem Improvement Program.....	1482
Machinery Markets and News of the Works.....	1483

through from the ore to the finished steel products, at first the plant will be used for assembling work, such as is now done at many automobile and other plants in this country. The company is in a sense an amalgamation of various steel and steel products companies, with a Detroit automobile, a St. Paul tractor and other companies interested. The capital will be largely from the United States.

### National Hardware Association Meeting

The eighth annual meeting of the National Hardware Association of the United States will be held at the William Penn Hotel, Pittsburgh, Friday and Saturday, June 6 and 7. The addresses at the metal branch meeting will be the following:

The Present and Prospective Price Situation. Hon. A. C. Miller, Federal Reserve Board, Washington.

The Effect of the War in Increasing the Iron and Steel Production of the United States, Allied and Enemy Countries. A. I. Findley, editor in chief The Iron Age, New York.

The Pig Tin Situation. R. R. Honor, U. S. Bureau of Mines, Washington.

The Copper Market. Greenville Mellen, Continuous Rolling Mills, Garwood, N. J.

Coke Plate Situation. Louis Follet, Standard Tin Plate Co., Canonsburg, Pa.

Was Governmental Supervision of Iron and Steel Prices Beneficial? Clifford E. Pierce, Betz-Pierce Co., Cleveland.

Destructive Competition. J. George Fuchs, Bruce & Cook, New York.

## WEIRTON STEEL CO. PLANS

### Will Build Open-hearth Plant and Finishing Mill —More Blast Furnaces

PITTSBURGH, May 27—(By Wire).

The Weirton Steel Co. has decided to build an open-hearth steel plant and finishing mills at Weirton, W. Va., and some contracts have already been placed. The initial steel plant will consist of seven 100-ton, open-hearth furnaces, work on the foundations for which has been started. There will also be a 40-in. blooming mill installed, the contract for which has not yet been placed, and the company has placed an order with the Morgan Construction Co., Worcester, Mass., for an 18-in. and 21-in. finishing mill on which slabs, sheet bars and small billets will be rolled. The output of the open-hearth plant is expected to be about 1500 tons per day, all of which will be used in the present tin plate mills, hoop and band mills, hot and cold rolled strip mills now at Weirton, and in addition the company will still be a large buyer of steel in the open market. The company is making other extensions, and has now under way the building of a complete hospital for use of employees, and is also building from 300 to 400 houses to be used as homes for its employees. A still larger number of houses will be built when those now under way are completed, and eventually Weirton will be a good sized city.

The Weirton Steel Co. recently finished building a 600-ton blast furnace, which is already to go in blast, but it probably will not be started for 60 or 90 days yet, owing to the limited demand for pig iron. The company has plans for three more blast furnaces, to be built later, but work on the second stack will likely not be started until the new steel plant has been finished. The output of its first blast furnace will be used in the steel works, and in addition the company will be a buyer of pig iron in the open market, at least until the second blast furnace has been placed in operation. In addition to its tin plate plant and finishing mills at Weirton, the Weirton Steel Co. also operates a tin plate plant at Steubenville, Ohio, and another tin plate plant at Clarksburg, W. Va.

### Government Machinery Appraisal

WASHINGTON, May 27.—Representatives of the Director of Sales and the Ordnance Bureau have decided upon a system of "automatic appraisal" for machine tools to be sold by the Government. This is now being put into operation by the district ordnance boards, and completed inventories, with appraised prices, are expected within a month. Much of the delay, it is announced, has been caused by the fact that the Ordnance Bureau had until May 15 to determine just what machine tools it would keep for peace requirements. The final figures of the reserves asked for are larger than originally expected, so that less than half of the department's surplus of machine tools is to reach the market.

The appraisal of the machine tools is to be made on the basis of two independent charts. The first of these touches upon the condition of the machines. It was worked out by the War Industries Readjustment Commission of the American Society of Mechanical Engineers, and was approved last week at a conference of this commission held in New York with the representatives of the War Department. The latter were Majors C. E. Fitch and G. B. Dusenberre for the Ordnance Bureau and C. E. Hildreth and V. C. Kylberg for the Director of Sales. This plan takes 15 years as the average period of obsolescence for an unused machine tool. The deterioration is then based upon a graduated scale of faster depreciation depending upon the actual amount of use to which the machine has been put. In addition to this, there is a price chart, by which this depreciation of condition is converted into dollars.

Although there is always the possibility that some of these machine tools will be sold abroad, if the French and Belgian Governments desire them for rehabilita-

tion purposes, the War Department seems to place little expectation upon such sales.

The War Department approves the inclusion in the forthcoming Army Appropriation bill of a clause to authorize the disposition of the part of the machine tool surplus to colleges and technical schools.

C. W. Hare, Director of Sales, has compiled a detailed statement showing the disposition of \$236,130,000 worth of sales leaving a balance of \$1,695,370,000 out of the total surplus of \$1,931,500,000 turned over to his office Jan. 17, 1919.

"In effecting sale of the \$236,000,000 worth of property which has been marketed," says a War Department statement, "the Director of Sales has recovered for the Government 88 per cent of the original cost of the materials sold. This is regarded as a higher percentage than the future market will permit, since the materials now declared surplus were purchased in a war-time market when labor and raw material were at the peak. Establishment of peace is expected to result in a general lowering of price scales."

### Aircraft Standardization Committee Going Abroad

WASHINGTON, May 27.—The War Department has decided to send an aircraft standardization committee to France to co-operate with the general aircraft commission, under the leadership of Assistant Secretary Crowell, who sailed last week. The committee is to investigate the progress which has been made in the standardization of aircraft building in Europe, both for civilian and military purposes. Its makeup is as follows: Charles F. Kettering, Dayton-Wright Aircraft Co.; Capt. Edson Gallaudet, Providence, R. I.; Glenn H. Curtiss, Curtiss Engineering Corporation; Charles M. Manly, Society of Automotive Engineers; J. G. Vincent, Packard Motor Car Co.; C. F. Clarkson, Society of Automotive Engineers; Dr. John A. Mathews, president Halcomb Steel Co., Syracuse, N. Y.; Dr. A. C. Dickinson, Bureau of Standards; William Knight, National Advisory Committee for Aeronautics.

The members of the committee will probably sail this week or the week following. Secretary Crowell's advisers, who are to study all phases of the aircraft problem, civilian as well as military, are headed by Col. Halsey Dunwoody, now in France as chief of the Air Service Supply. The other members include Capt. Harry C. Mustin of the Navy, Lieut.-Col. James A. Blair, Jr., of the General Staff; S. S. Bradley, Manufacturers' Aircraft Corporation; G. H. Houston, president Wright-Martin Aircraft Corporation; C. M. Keys, vice-president Curtiss Aeroplane & Motors Co., and Howard Coffin, Council of National Defense.

### Acquires Control of Otis Steel Co.

Having purchased approximately 75 per cent of the stock of the Otis Steel Co., Cleveland, and substantially a like proportion of the common stock which has been held by the British stockholders, William Salomon & Co., 25 Broad Street, New York, bankers, are now offering to buy the remainder held in this country. The announcement of the offer to purchase was made in THE IRON AGE of April 24.

Salomon & Co. stipulated that to put the deal through it would be necessary for them to acquire 60 per cent of both the common and preferred stock outstanding, amounting to \$4,800,000 in common and \$2,400,000 preferred. It is generally understood that no other steel company, or other American interest, is involved in this deal, but that Salomon & Co. are acquiring control of the property for themselves.

### Heroult Furnaces for Navy Ordnance Plant

A decision has been reached as to the type of electric furnaces to be used in the Navy ordnance plant at Charleston, W. Va. Two 30-ton Heroult furnaces will be installed and will be used in conjunction with open-hearth furnaces for duplexing. It is expected that it will be possible to produce as high as 38 tons to a heat in these furnaces with heats every three hours.

# Iron and Steel Markets

## LARGER DEMAND FOR STEEL

### Sentiment Improved and Prices Are Generally Maintained.

#### Automobile Makers Buy Several Hundred Thousand Tons—More Rails Needed

Demand for steel has improved measurably and sentiment throughout the trade has turned for the better. Some of the change is due to the failure of the Railroad Administration to break the price of rails and to the belief that the 200,000 tons grudgingly placed must be followed by a much larger amount. Here and there slight reductions are made from the March 21 schedule on finished steel, but manufacturers generally have been firmer than buyers expected them to be.

Predictions of lower prices are now less frequent and less confident. Yet there is thus far no distinct improvement in the scale of mill operations. The business of the past week is thought much of because the trade has got on so long on so little.

Significant contracts are those just closed by two large automobile companies, one amounting to more than 300,000 tons of billets, sheets, wire and tubes, on which deliveries extend into 1920. A third motor car builder is now in the market for a large tonnage. While no formal guarantee of prices was made on these contracts, they are considered to be subject to revision on undelivered portions if the market declines.

More buyers have come into the market in the past ten days seeking to make contracts for 60 to 90 days, whereas hand-to-mouth buying has been their rule for six months. A 6000-ton sheet-bar contract is an example.

The Railroad Administration has bought under protest the 200,000 tons of steel rails on which bids were taken May 17, paying \$47 for open-hearth rails, the price named by the Bethlehem, Lackawanna, Colorado, Carnegie, Illinois and Tennessee companies. The Midvale bid was \$57 for open-hearth and \$55 for Bessemer rails. The Lackawanna and Bethlehem awards were 40,000 tons, while the Colorado mill received 20,000 tons and the three Steel Corporation subsidiaries 100,000 tons.

It is evident that urgent needs of the railroads have been ignored while the director general has been fighting to break the steel market, since delivery of all the 200,000 tons in 60 days is called for and more than 50 lines will share in the order, an average of 4000 tons each. Further buying is looked for, as legitimate needs are put at a million tons more.

Contributing to the better feeling in the market is the decision to reinstate on car builders' books some 20,000 cars for France. An earlier lot of 40,000 cars is now definitely canceled, an arrangement which, it appears, was forced by the Government as a consideration. The new cars will have to be sold subsequently in Europe when the United States has no use for them.

Easier ocean freight rates have put life into export inquiries, which are now developing into business in an increasing volume. Our cable reports the sale of billets at \$63, delivered in England, which represents no cut from the Pittsburgh price, counting ocean freight at \$20 per ton, occasionally obtainable lately at \$18. British billets are \$67.28. Only a little over \$1 separates buyer and seller on a large tonnage of steel-making pig iron for England. Hematite iron there has just been advanced \$3 per ton, or to \$42.92.

American tin plate is offered in England at \$7.20 per box against the British price of \$7.90. And on about 200 tons of plates an export sale has been made on the basis of 2.55c., a concession of \$2 per ton.

In domestic tin plate, on orders going to the mills, fair sales have been made for the third quarter and second half of the year at \$7 per box. From stock, however, concessions of 50c. and 75c. are reported. Tin and terne plate production for the year is now estimated at 60 per cent of the record rate of 1,500,000 tons last year.

The pig iron market is featured by inquiries for last half requirements. What sales have been made are mostly for foundry iron. Tennessee furnaces have reduced such iron \$1 per ton, most of which is represented by their freight advantage over Alabama furnaces on shipments to the North.

Three sales of ore aggregating 340,000 tons stand, together with several good inquiries pending, as an indication of the reaction of the improved steel market. There is little talk now of lower ore prices.

## Pittsburgh

PITTSBURGH, PA., May 27.

Reports from sales departments of a number of the larger steel companies this week indicate that the better feeling in the steel business, which started to make itself felt about two weeks ago, is steadily getting stronger. While still largely confined to sentiment, there has been a considerable increase in new orders on nearly all kinds of semi-finished and finished steel products. As an instance we can report a sale of 6000 tons of sheet bars for third quarter delivery, made by a Youngstown mill, and at the prevailing full price of \$42 at mill. A month ago such a purchase would hardly have been considered. From nearly all lines of finished steel come reports of larger specifications and more liberal orders. There is a more decided tendency on the part of consumers and jobbers as well to look ahead, history showing that if a decline in the market takes place before such orders are filled, the buyer always expects the benefit of the decline.

While the situation is decidedly better the trade recalls that the dull season is near at hand, July and August being quiet months under normal conditions. But the West, particularly, is now doing business, though only a month or six weeks ago buyers were waiting for lower prices. One thing which is regarded as helping conditions is that the steel makers instead of trying to run their plants by cutting prices, took the other course, and decided that if they could not get orders at their prices they would operate only to such extent as orders would warrant.

In the pig iron trade, the shut down of the many furnaces has strongly helped to sustain prices, and

# A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	May 27, 1919	May 20, 1919	Apr. 29, 1919	May 28, 1918
No. 2 X, Philadelphia...	\$29.50	\$29.50	\$31.90	\$34.25
No. 2, Valley furnace...	26.75	26.75	26.75	33.00
No. 2 Southern, Cin'ti...	29.35	29.35	30.35	35.90
No. 2, Birmingham, Ala...	26.75	26.75	26.75	33.00
No. 2, furnace, Chicago...	26.75	26.75	26.75	33.00
Basic, deliv., eastern Pa...	29.65	29.65	29.65	32.75
Basic, Valley furnace...	25.75	25.75	25.75	32.00
Bessemer, Pittsburgh...	29.35	29.35	29.35	36.15
Malleable, Chicago...	27.25	27.25	27.25	33.50
Malleable, Valley...	27.25	27.25	27.25	33.50
Gray forge, Pittsburgh...	27.15	27.15	27.15	32.75
L. S. charcoal, Chicago...	38.85	38.85	38.85	37.50

Rails, Billets, Etc., Per Gross Ton:	May 27, 1919	May 20, 1919	Apr. 29, 1919	May 28, 1918
Bess. rails, heavy, at mill...	45.00	45.00	45.00	55.00
O-h rails, heavy, at mill...	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh...	38.50	38.50	38.50	47.50
O-h billets, Pittsburgh...	38.50	38.50	38.50	47.50
O-h sheet bars, P'gh...	42.00	42.00	42.00	51.00
Forging billets, base, P'gh...	51.00	51.00	51.00	60.00
O-h billets, Phila...	42.50	42.50	42.50	50.50
Wire rods, Pittsburg...	52.00	52.00	52.00	57.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.595	2.595	2.595	3.685
Iron bars, Pittsburgh...	2.35	2.35	2.35	3.50
Iron bars, Chicago...	2.50	2.50	2.50	3.50
Steel bars, Pittsburgh...	2.35	2.35	2.35	2.90
Steel bars, New York...	2.62	2.62	2.62	3.095
Tank plates, Pittsburgh...	2.65	2.65	2.65	3.25
Tank plates, New York...	2.92	2.92	2.92	3.445
Beams, etc., Pittsburgh...	2.45	2.45	2.45	3.00
Beams, etc., New York...	2.72	2.72	2.72	3.195
Skelp, grooved steel, P'gh...	2.45	2.45	2.45	2.90
Skelp, sheared steel, P'gh...	2.65	2.65	2.65	3.25
Steel hoops, Pittsburgh...	3.05	3.05	3.05	3.50

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	May 27, 1919	May 20, 1919	Apr. 29, 1919	May 28, 1918
Sheets, black, No. 28, P'gh...	4.35	4.35	4.35	5.00
Sheets, galv., No. 28, P'gh...	5.70	5.70	5.70	6.25
Wire nails, Pittsburgh...	3.25	3.25	3.25	3.50
Cut nails, Pittsburgh...	4.25	4.25	4.25	4.00
Fence wire, base, P'gh...	3.00	3.00	3.00	3.25
Barb wire, galv., P'gh...	4.10	4.10	4.10	4.25

Old Material, Per Gross Ton:	May 27, 1919	May 20, 1919	Apr. 29, 1919	May 28, 1918
Carwheels, Chicago...	\$20.50	\$20.50	\$21.00	\$22.00
Carwheels, Philadelphia...	\$20.00	20.00	22.00	29.00
Heavy steel scrap, P'gh...	15.50	14.50	15.00	29.50
Heavy steel scrap, Phila...	15.00	15.00	15.00	29.00
Heavy steel scrap, Ch'go...	15.50	15.25	15.75	29.00
No. 1 cast, Pittsburgh...	17.00	17.00	18.00	28.50
No. 1 cast, Philadelphia...	21.50	21.50	22.00	29.00
No. 1 cast, Ch'go, net ton	19.50	19.50	20.00	29.50
No. 1 RR. wrot, Phila...	21.00	21.00	21.00	34.00
No. 1 RR. wrot, Ch'go, net	15.75	15.25	15.50	29.75

Coke, Connellsville, Per Net Ton at Oven:	May 27, 1919	May 20, 1919	Apr. 29, 1919	May 28, 1918
Furnace coke, prompt...	\$4.00	\$3.75	\$3.50	\$6.00
Furnace coke, future...	4.00	4.00	4.00	6.00
Foundry coke, prompt...	4.50	4.50	4.00	7.00
Foundry coke, future...	5.00	5.00	4.50	7.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	16.75	16.75	15.50	23.50
Electrolytic copper, N. Y.	16.50	16.50	15.25	23.50
Spelter, St. Louis...	6.25	6.25	6.02 1/2	7.25
Spelter, New York...	6.60	6.60	6.37 1/2	7.50
Lead, St. Louis...	5.00	5.00	4.70	6.85
Lead, New York...	5.25	5.25	4.95	7.05
Tin, New York...	72.50	72.50	72.50	\$1.00
Antimony, Asiatic, N. Y.	8.25	7.75	8.62 1/2	12.25
Tin plate, 100-lb. box, P'gh...	\$7.00	\$7.00	\$7.00	\$7.75

there now is very little expectation among consumers that prices of pig iron will be lower. Those connected closely and otherwise with the steel trade appear to have decided that steel is in for a period of high prices, which will remain for some time. There is no thought on the part of employers to reduce labor, and this, it is held, would certainly have to be done before any material reductions in steel prices could be made. There has been shading in prices, mostly in specialties and in certain sections, but in the main steel prices have held remarkably well, and seem to be getting stronger.

Reports from the building trade all over the country are encouraging, and many intending builders have about decided that present prices of material and labor will probably hold for some time, and they are going ahead with projects. It is believed the steel trade will gather further strength just as soon as the peace treaty is signed. Export inquiry for finished steel is fairly active, especially on plates and rails, and domestic mills promise to secure a large amount of export business over the next year.

**Pig Iron.**—There is a little more inquiry for foundry iron in small lots, ranging from 50 up to 200 and 300 tons, but in Bessemer and basic the market is almost entirely neglected. There is an inquiry for 250 tons of Bessemer and a Lorain, Ohio, steel interest has had an inquiry here for a week, or more, for 5000 to 6000 tons of basic, but none of the local sellers seems to want to cut the regular price, and the business, if placed, will not likely come here. The Standard Sanitary Mfg. Co. is in the market for 2000 to 4000 tons of foundry for its Louisville works, but probably will buy Southern iron. Two local dealers who quoted on this inquiry named the regular price of \$26.75, Valley furnace, or its equivalent from other points of shipment, but do not expect to get the business. Referring to the present pig iron situation, a large producer has stated that there were a good many disproportionate factors involved in the Government's system of price fixing, such

as some of the differentials, the uniform price at all blast furnace points, basing points, etc. It is believed that all these things that are unfair and out of proportion will wear away against the friction of competition and negotiation between buyer and seller and between sections. It is believed that the Buffalo, Eastern, Valley, Pittsburgh, Birmingham, Virginia and Tennessee prices will all gradually resume their old relations to each other, when there is enough demand for pig iron to make furnace men feel that the production and selling of pig iron are again normal. It is almost certain that prices on all grades of pig iron are being shaded, in some cases from 50c. to \$1 per ton, but it is very difficult to find a concrete case of price cutting by a furnace. In a sale the other day of only 50 tons of foundry iron the price was cut 40c. per ton. Furnaces do not expect any material decline in prices of iron, but there will probably be certain readjustments in prices, when actual business in pig iron starts up again. One of these will be some change in the present differential in favor of Bessemer iron over basic, which is \$2.20 per ton, and which, it is pointed out, is too great. In the absence of reliable information as to any cutting in prices of iron by furnaces that sell in the open market, we repeat prices of last week as follows:

Basic pig iron, \$25.75; Bessemer, \$27.95; gray forge, \$25.75; No. 2 foundry, \$26.75; No. 3 foundry, \$26.25, and malleable, \$27.25; all per gross ton at Valley furnaces, the freight rate for delivery in the Cleveland and Pittsburgh districts being \$1.40 per ton.

**Billets and Sheet Bars.**—A Youngstown, Ohio, steel mill reports a sale of 6000 tons of sheet bars for third quarter delivery at the reported regular price of \$42 at mill. This is the first large sale of sheet bars reported in this district for some time. Inquiry for billets and sheet bars is perhaps a little better, and some consumers are using more steel than at any time for four or five months. It is said regular prices are being held on the very small amount of business being placed. Steel mill operations are still on a basis of 50 to 60

per cent of normal, but give promise of being heavier in the near future.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$38.00, 2 x 2 in. billets at \$42; sheet bars, \$42; slabs, \$41, and forging billets \$51 base, all f.o.b. at mill, Pittsburgh or Youngstown.

**Ferroalloys.**—Inquiry for alloys is still very light, and any sales being made are resale material at prices very much lower than producers of ferroalloys would accept. As an instance, a sale was made recently of two cars, or about 60 tons, of 78 to 82 per cent ferromanganese at about \$95 delivered, but some concerns will not meet this price and are holding for about \$110 delivered. There is an accumulation of about 50 per cent ferrosilicon, and it is being offered at low prices, reports being that \$85 has been shaded.

We quote 78 to 82 per cent resale ferromanganese at \$95 to \$105 delivered, with a reduction of about \$2 per unit for lower percentages. We quote resale 50 per cent ferrosilicon at \$35 to \$90 and resale 18 to 22 per cent spiegeleisen at \$33 to \$35 delivered. Prices on Bessemer ferrosilicon are: 9 per cent \$13, 10 per cent, \$45; 11 per cent, \$48; 12 per cent, \$51. We quote 6 per cent silvery iron, \$36.75; 7 per cent, \$37.75; 8 per cent, \$40.25; 9 per cent, \$42.25, and 10 per cent, \$44.75, but some sellers not in Jackson County have been quoting on a basis of \$35 for 6 per cent. About \$3 per gross ton advance is charged for each 1 per cent silicon for 11 per cent and over. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which have a uniform freight rate of \$2.90 per gross ton for delivery in the Pittsburgh district.

**Plates.**—As yet there is not much betterment in new demand for plates, which is for only 30 to 40 per cent of normal capacity. No new cars are being placed and operations among boiler shops and other large consumers of plates, aside from the Government, are at a low ebb. The Carnegie Steel Co. has lately taken a large amount of Government business in plates, and is operating its Homestead and Lower Union plate mills to about 75 per cent of capacity. It is said that on the small amount of new domestic business being placed, regular prices on plates are holding, but on some recent export business they have been shaded \$2 to \$3 per ton. On domestic orders we quote 1/4-in. and heavier sheared plates at 2.65c at mill, Pittsburgh.

**Structural Material.**—Local fabricators report an increase in amount of inquiry and say they are figuring on a large amount of business, but it is very slow in being placed. The McClintic-Marshall Co. has taken 200 tons for a warehouse for the Columbia Steel & Shafting Co., Cleveland, 600 tons for a beet sugar factory at Korea, and two elevated stations in Philadelphia, 175 tons. The Massillon Bridge Co., Massillon, Ohio, has taken 500 tons for an addition to a building for the Goodyear Rubber Co. at Akron, and is also said to have taken 2000 tons, or more, for new mill buildings for the Central Steel Co., Massillon, Ohio. Active jobs in the market include 1500 to 1800 tons for new mill buildings for the Columbia Steel Co., Warren, Ohio, and about 1000 tons for a store building in Detroit. Fabricators report that mills are holding prices on plain steel very firmly. We quote beams and channels up to 15 in. at 2.45c. at mill, Pittsburgh.

We quote beams and channels up to 15 in. at 2.45c. at mill, Pittsburgh.

**Sheets.**—There is a steady increase in the inquiry for sheets, orders being booked by the mills at present being heavier than for months. The automobile builders are specifying very freely against contracts, and on special finish sheets mills are sold up for some time. The demand for electrical sheets is also showing betterment, and independent mills are now reported as operating at about 65 per cent of capacity. It is said the mills are holding prices of sheets, and any shading is by jobbers, who desire to move stocks out more promptly. Export inquiry is very active, and the leading interest is taking good-sized orders for black and blue annealed sheets right along. It is said there has been some little shading in prices on blue annealed sheets by three or four of the leading mills, which are selling on the plate basis with plate extras. Regular prices on sheets are given in detail on page 1476.

**Iron and Steel Bars.**—There is more inquiry in the market for steel bars than for some time. The imple-

ment makers are looking around for their supply of bars for last half of the year, and probably will contract in the near future. It is said their stocks of bars are pretty well worked off, and they are sounding the mills as to a guarantee in price and also a concession from the 2.45c. price, which they claim they should have. The mills are objecting to both of these conditions, but it is not improbable that some of the very largest consumers may obtain a slight concession when they are ready to close. The general demand for iron and steel bars is a little better, but is still largely confined to small lots for prompt shipment, the number of orders being placed showing a steady increase. Two mills rolling reinforcing bars report more inquiry at present than at any time this year.

We quote soft steel bars rolled from billets at 2.35c. from old steel rails, 2.45c. Bar iron is quoted at 2.35c. for Eastern shipment and 2.55c. for Western shipment.

**Tin Plate.**—Two leading mills report an increase in inquiry, and state they have booked in the past two weeks some fair-sized contracts for tin plate for third quarter and also for last half of the year delivery. It is said that prices on production tin plate are being firmly held on the basis of \$7 per box, but stock items, for which the demand is active, are being shaded from 50c. to 75c. per base box. One mill has booked an order for about 2000 boxes of stock plate at about 50 cents per box under the current price for production plate. Last year the output of tin plate in this country was between 32,000,000 and 33,000,000 base boxes, but the output this year is not expected to be over about 60 per cent of that, or not to exceed 19,000,000 to 20,000,000 boxes. Makers state there has to be a cleanup year in the tin plate trade about every five or six years, and this year seems to be the one selected to clean up stocks as far as possible. There is some export demand for tin plate, but only a fair amount of business for export is being placed. Operations of the tin mills are still on about a 50 per cent basis, but are expected to be heavier in the near future. We quote production tin plate at \$7 per base box, f.o.b. Pittsburgh, for delivery over the remainder of this year, the price to be readjusted on any unshipped portions of contracts, should the open market price decline. The demand forterne plate is reported more active than for some time, and prices are given on page 1476.

**Wire Rods.**—The inquiry is limited mostly to small lots for prompt shipment. There is some export inquiry, but the amount of foreign business being placed is small. Rod mills are operating on about a 50 per cent basis. Detailed prices on rods are given on page 1476.

**Wire Products.**—New orders and specifications against contracts for wire and wire nails have shown a considerable increase in the past two weeks and makers are greatly encouraged over the outlook for the wire trade, which they say is better now than at any time since the armistice was signed. Jobbers and consumers are showing more interest in the market, and are more inclined to contract ahead. On plain and barbed wire and wire fencing two leading mills report they are well sold up over the next 60 days, and the rate of operation among several wire mills is showing an increase. It is said prices on bright nails plain and barbed wire and wire fence are being very firmly held, but prices on coated nails are still being shaded in some sections from 10c. to 15c. per keg. Prices on wire products are given in detail on page 1476.

**Steel Rails.**—Last week the Government placed 200,000 tons of steel rails, dividing the business among Carnegie, Illinois, Lackawanna, Bethlehem and the Colorado mills, another producer not sharing in the order, as it is stated it quoted \$55 for Bessemer and \$57 for open hearth rails, while the other mills quoted \$45 for Bessemer and \$47 for open-hearth. It is reported here the Government will soon place 200,000 tons more of steel rails, but this is not confirmed. We quote standard section Bessemer at \$45 and open-hearth \$47 at mill, Pittsburgh.

**Hot-Rolled Strip Steel.**—It is reported there is more or less irregularity on prices of hot-rolled strip steel, owing to the willingness of one or two makers to sell on the band base of 3.05c. The regular price on hot-rolled strip steel is \$3.30 per 100 lb., f.o.b. Pittsburgh.

**Cold-Rolled Strip Steel.**—Makers report a little more inquiry, but jobbers and consumers are still inclined to buy only in small lots for prompt shipment. It is said prices are being firmly held in nearly all cases.

We quote cold-rolled strip steel at \$5.65 base per 100 lb., f.o.b. Pittsburgh, for 1½-in. and wider, 0.100 in. and thicker hard tempered in coils 0.20 carbon and under. Boxing charge 25c per 100 lb.

**Nuts and Bolts.**—A meeting of the Institute of Nut and Bolt Manufacturers was held in Chicago on Wednesday, May 21, at which general conditions were fully discussed, reports showing some betterment in the demand in the past two weeks, and discounts effective from March 28 last were reaffirmed. There is some shading in prices on large orders, but it is said this does not exceed 5 per cent. Discounts on nuts and bolts are given on page 1476.

**Shafting and Screw Stock.**—Makers report some increase in orders and the automobile trade and also concerns making automobile parts are specifying very freely against contracts. Present demand for shafting is said to be about 40 per cent of normal, and makers state discounts are being firmly held.

We quote cold-rolled shafting at 28 per cent off list to carloads and 23 per cent in less than carloads, f.o.b. Pittsburgh.

**Hoops and Bands.**—In the past two weeks the demand for hoops and bands has been heavier than at any time for four or five months, two local makers reporting they have booked more orders so far in May than in any two previous months since the armistice was signed, and they also claim that the regular price and extras are being firmly held. The price on hoops and bands is given as 3.05c, Pittsburgh, plus usual extras.

**Spikes.**—The inquiry for spikes of all kinds is light and makers are disappointed over the fact that no inquiries have yet come out from the railroads for the spikes to accompany the 200,000 tons of rails placed by the Government last week. The inquiry for boat and barge spikes is light, as very few wooden boats or barges are being built at present. Makers claim regular prices are firmly held.

We quote standard spikes, 9/16 x 4½ in. and also small spikes, \$3.35 base per 100 lb. in carload lots of 200 kegs or more plus usual extras. Boat and barge spikes, \$3.85 per 100 lb. in carload lots of 200 kegs or more.

**Iron and Steel Pipe.**—The heavy demand for lap-weld pipe and oil country goods, which has been a feature of the market for some time, still continues, and on some lines of oil country goods several mills report they are four to six weeks behind in delivery. The inquiry for merchant pipe, which includes mostly butt-weld sizes, is reported as showing signs of getting larger. A good many inquiries for butt-weld pipe are coming from the far West, where it is said building operations are active. It is reported almost innumerable gas and oil well line projects are being figured on, and mills state that unless the contracts for these gas and oil well lines are soon placed, the gas and oil concerns that intend laying these lines will not be able to get the pipe this year. The Lone Star Gas Co. has an active inquiry in the market for close to 250 miles of pipe up to 18 in. and this order is likely to be placed in a very short time. It is said that prices on iron and steel pipe are being more firmly held at present by the jobbers, and also by the mills, than at any time for some months. Discounts on iron and steel pipe are given on page 1476.

**Boiler Tubes.**—The demand for merchant and locomotive tubes is still very light, but mills say there are signs of more inquiry for locomotive tubes in the near future. Two leading locomotive builders recently took export orders for a large number of locomotives, and are now reported in the market to cover on the tubes.

Discounts on iron and steel tubes are given on page 1476.

**Coke.**—Prices on coke are firmer now than at any time in the past four or five months, and this is due largely to the policy of coke producers in steadily cutting down output to meet actual demands and also to the fact that the stocks of surplus coke loaded on cars have been pretty well cleaned up. No contracts are being made for blast furnace coke, but prices are being adjusted from month to month. We now quote standard grades of 48-hr. blast furnace coke at \$4 to \$4.25, but some off grades of furnace coke can be still had at \$3.75 per net ton at oven. For June shipment blast furnaces expect to pay for the better grades of furnace coke \$4.50 or higher at oven. We quote 72-hr. foundry coke at \$4.50 to \$4.75 for prompt shipment, while on contracts for last half of the year the best of foundry coke is held at about \$5, some producers asking as high as \$5 at oven. Output of coke in the Upper and Lower Connellsville regions last week was 83,284 tons, said to be the lowest output of coke in these two regions for over 25 years. The Frick Coke Co. and other large producers have lately blown out a large number of ovens, the former because so many blast furnaces of the Carnegie Steel Co. and other interests of the Steel Corporation are idle.

**Old Material.**—The better feeling in the scrap market of the past two weeks is now reflected in prices which are firmer than for a long time, and on steel making scrap are from 50c. to \$1 per ton higher. The Carnegie Steel Co. seems willing to take in selected heavy steel melting scrap at \$16 delivered to point of consumption, but this price is probably about 50c. above the general market. We note, however, that prices on heavy steel scrap are up from 50c. to \$1 per ton over the low point of two or three weeks ago. Some consumers that have not been in the market for a long time are quietly figuring on purchases of steel scrap, believing that it is a good purchase around \$16. Dealers are not inclined to push sales, believing that prices on scrap will be higher before long, owing to the better feeling in the pig iron trade, and also because stocks of scrap in consumers' yards are reported low. The Pennsylvania Railroad scrap list came out yesterday and is fairly heavy. Bids are to be in by June 3, and awards are to be mailed to successful bidders not later than June 7. It is predicted that this road will get higher prices for its scrap when awards are made next month than it has for some time.

Heavy steel, melting, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered .....	\$15.50 to \$16.00
No. 1 cast, for steel plants .....	17.00 to 17.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh .....	16.00 to 16.50
Compressed steel .....	13.50 to 14.00
Bundled sheet, sides and ends, f.o.b. consumers' mills, Pittsburgh district .....	11.00 to 11.50
Bundled sheet stamping .....	10.00 to 10.50
No. 1 busheling .....	13.50 to 14.00
Railroad grate bars .....	13.00 to 13.50
Low phosphorus melting stock (bloom and billet ends, heavy plates) ¼ in. and heavier .....	22.00 to 22.50
Iron car axles .....	28.00 to 29.00
Locomotive axles, steel .....	28.00 to 29.00
Steel car axles .....	25.00 to 26.00
Railroad malleable .....	14.00 to 15.00
Machine shop turnings .....	10.00 to 10.25
Cast iron wheels .....	19.00 to 20.00
Rolled steel wheels .....	17.00 to 18.00
Sheet bar crop ends (at origin) .....	18.00 to 18.50
Heavy steel axle turnings .....	12.00 to 13.00
Heavy breakable cast .....	18.00 to 19.00
Cast iron borings .....	11.00 to 11.25
No. 1 railroad wrought .....	19.00

Director General Hines has authorized publication, on one day's notice, of new commodity rate on by-product coke Lorain and South Lorain, Ohio, to Youngstown, Ohio, \$1.50 a net ton, the same rate as is now in effect in the opposite direction. It is to be made effective on short notice, on account of the accumulation caused by closing of furnaces at Lorain, making it necessary to find a market at other points for this coke.

## Chicago

CHICAGO, May 27—(By Wire).

Sentiment is steadily growing more optimistic. Although there has been no marked turn for the better as yet, business is gradually improving and for the most part prices are being adhered to. Structural material continues active. The Government has reinstated 350 additional military cars for France, the construction of which had been suspended, and a contract for 100 poultry cars has been awarded to a Chicago car builder. The Chevrolet Motor Co. has let 600 tons for its St. Louis body plant to a fabricator in that city. Seven thousand tons for two Chicago bridges and about 500 tons for the Edison Electric Appliance Co., Chicago, are expected to be awarded soon. Bids are expected to be asked within the next two months on three Chicago hotel projects involving about 4000 tons. No further changes in the prices of finished materials have been reported since the reduction in cast-iron pipe, announced a week ago. Some sheet mills, however, are again showing a disposition to shade, in some instances to the extent of \$2 to \$4 per ton.

Mill operation is on the upturn. The leading independent, which was operating at 55 per cent of capacity last week, is now on a 60 per cent basis. Although the foremost interest continues on a 60 per cent basis, orders recently booked and in prospect forecast an improvement next week.

Pig iron, which has been dormant for months, is finally showing signs of life. A number of orders ranging from 100 to 1000 tons have been received, and several encouraging inquiries are pending, one being for 2400 tons and the other for 1200 tons of foundry for second half delivery. Activity is largely confined to foundry grades, although low phosphorus and standard Bessemer are reviving somewhat. Prices remain unchanged with the exception that an important Southern producer, as announced last week, is selling for May and June delivery on a Chicago base, absorbing the freight.

**Ferroalloys.**—As resale stocks of ferromanganese are fast disappearing, it is expected that it will soon show a tendency to advance. There is little activity in any of the ferroalloys in this district, but it is reported that there is an inquiry for 600 tons of ferromanganese in Pittsburgh.

We quote 80 per cent ferromanganese, resale, at \$116 to \$125, delivered; 50 per cent ferrosilicon, resale, at \$110, delivered; 16 to 22 per cent spiegeleisen, resale, at \$30, delivered; spiegeleisen, 18 to 22 per cent, \$35 furnace.

**Pig Iron.**—There has been a revival of activity, evidenced by orders and inquiries for round tonnages. Not only has spot business for May and June delivery increased, but consumers are beginning to provide for their last half requirements. Among recent orders are lots of 1000 and 900 tons of Northern foundry each, 600 tons of low phosphorus, 500 tons of off sulphur Bessemer, 500 and 350 tons of Southern foundry and several lots of from 100 to 200 tons. Activity is confined largely to foundry grades, although some interest is being manifested in low phosphorus and standard Bessemer. Basic, malleable and silvery are quiet. Several inquiries of encouraging proportions are before the trade. A manufacturer of pipe fittings is in the market for 2400 tons of Northern foundry, silicon 2.75 to 3.25, for delivery in the last half at the rate of 400 tons per month. Another melter is inquiring for 1200 tons of foundry for second half requirements. Although business has by no means reached normal, the trade is more optimistic than it has been at any time this year. One representative seller expects May sales will be twice those of April, and another dealer secured orders during the week totaling about 7000 tons, or more business than developed in any previous week this year. Furnaces, however, continue at a low state of production, only five merchant stacks in this district still being in blast. During the recent slack period considerable quantities of merchant iron were piled. It is estimated that a total of 100,000 tons is now lying on furnace banks. Producers continue to hold to prices with the exception of one important Southern producer, which is

now selling on a Chicago base for May and June delivery, thereby absorbing the freight. As this interest is securing business on this basis, it is believed that competitors will have to follow suit if they desire additional orders for the first half.

The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton:

Lake Superior charcoal, average silicon, 1.50c. second half delivery, f.o.b. furnace, average freight to Chicago \$2.50 (other grades subject to usual differentials).....	\$29.25
Lake Superior charcoal, first half, nominal.....	38.85
Northern coke foundry, No. 1 silicon, 2.25 to 2.75 .....	28.00
Northern coke foundry, No. 2 silicon, 1.75 to 2.25 .....	26.75
Northern high-phosphorus foundry.....	24.75
Southern coke, No. 1 foundry and No. 1 soft silicon, 2.75 to 3.25.....	29.75
Southern coke, No. 2 foundry, silicon, 2.25 to 2.75 .....	28.00
Southern foundry, silicon, 1.75 to 2.25.....	26.75
Malleable, not over 2.25 silicon.....	27.25
Standard Bessemer .....	27.95
Basic .....	25.75
Low phosphorus (copper free).....	48.25
Silvery, 7 per cent.....	41.55

**Plates.**—Mill operation has improved, in some cases to the extent of having several weeks of work ahead. Business has increased somewhat, most of it coming from domestic sources, although some orders have been received from Japan and China. There have been no individual orders for larger tonnages, however.

The mill quotation is 2.65c., Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 3.67c. for plates out of stock.

**Structural Material.**—The Christopher & Simpson Iron Works, St. Louis, will fabricate 600 tons for the body plant of the Chevrolet Motor Co., St. Louis. The South Halsted Street Iron Works, Chicago, has the contract for 470 tons for the Randolph Street Viaduct, Chicago. The Milwaukee Bridge Co., Milwaukee, Wis., will fabricate 242 tons for the Addison Street Bridge, Chicago. Two hundred and thirty-three tons for the Oregon-Jackson Street Bridge, Oshkosh, Wis., has been awarded to the Wisconsin Bridge & Iron Co., North Milwaukee, Wis. The Minneapolis Steel & Machinery Co. will fabricate 108 tons for a municipal power plant at Hibbing, Minn. Three hundred tons of reinforcing steel has been awarded for a building to be constructed by the McDonald Chocolate Co. at Salt Lake City, Utah. A number of inquiries, some of them for round tonnages, are before the trade. The Edison Electric Appliance Co., Chicago, is expected to award the fabrication of 470 tons in New York to-day. Four thousand tons for the approaches to the Michigan Boulevard Bridge, Chicago, will probably be let this week. Bids on 3000 tons for the Wells Street Bridge, Chicago, will be taken within a few days. The Grip Nut Co. is taking bids on 240 tons for a plant addition in Chicago. The Chicago & Northwestern Railroad received bids last week on 145 tons for three bridges, two on the Sioux City division and one on the Minnesota division. Bids are expected to be asked soon on 500 tons for the Drake Hotel and on 2000 tons for the Webster Hotel, Chicago. Bids will be asked on 1500 tons for the Blackhawk Hotel, Chicago, early in July. Three hundred and fifty additional military cars for France, the construction of which had been suspended by the Government, have been reinstated. The Live Poultry Transit Co., Chicago, has awarded the construction of 100 poultry cars to a local car builder.

The Wells Brothers Construction Co., Chicago, has been awarded the general contract for the erection of a reinforced concrete viaduct for the Chicago, Burlington & Quincy at Canal Street, Chicago. The reinforcing steel, amounting to 400 tons, has not been let.

The mill quotation is 2.45c., Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.47c. for material out of warehouse.

**Bars.**—Although some reinforced concrete projects are maturing, business is not as good as in some other iron and steel products. Mill operation continues slow. The demand for rail-carbon steel has been stimulated

to a certain extent by increased activity on the part of bedstead manufacturers. One local manufacturer, for instance, has changed from single turn operation to double turn.

Mill prices are: Mild steel bars, 2.35c., Pittsburgh, taking a freight rate of 27c. per 100 lb.; common bar iron, 2.50 to 2.60c., Chicago; rail carbon, 2.45c., mill. Jobbers quote 3.37c. for steel bars out of warehouse.

**Sheets.**—Mill operation continues better. One maker is operating about 95 per cent of capacity and would be operating full if sufficient skilled labor were available. Business is fair and comes from varied sources. Some mills are again showing an inclination to shade prices, in some cases to the extent of \$2 to \$3 per ton.

Mill quotations are 4.35c. for No. 28 black; 3.55c. for No. 10 blue annealed, and 5.70c. for No. 28 galvanized.

Jobbers quote Chicago delivery out of stock; No. 10 blue-annealed, 4.57c.; No. 28 black, 5.37c., and No. 28 galvanized, 6.72c.

**Wire Products.**—Business continues good and manufacturers look for a continuation of it. Jobbers are steadily becoming less timid, with the result that orders for larger tonnages are being placed. For mill prices see Finished Iron and Steel, f.o.b. Pittsburgh, page 1476.

**Old Material.**—There is a better feeling among dealers which is evidenced by the bidding up of some prices in connection with the purchase of railroad material. The market is confined almost entirely to dealers, however, and it is uncertain what level prices will take when consumers commence to buy. The Illinois Central has issued a list totaling about 6500 tons, including 500 tons of rerolling rails, 500 tons each of No. 1 and No. 2 railroad wrought, and 450 tons of steel knuckles and couplers. The Chicago Great Western is offering 750 tons.

#### Per Gross Ton

We quote delivery in buyers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Iron rails	\$21.00 to \$22.00
Relaying rails	35.00 to 45.00
Carwheels	20.50 to 21.50
Steel rails, rerolling	17.50 to 18.00
Steel rails, less than 3 ft.	17.50 to 18.00
Heavy melting steel	15.50 to 16.00
Frogs, switches and guards cut apart	15.50 to 16.00
Shoveling steel	15.25 to 15.75

#### Per Net Ton

Iron angles and splice bars	\$17.25 to \$18.25
Steel angle bars	14.75 to 15.25
Iron arch bars and transoms	22.00 to 23.00
Iron car axles	26.50 to 27.50
Steel car axles	22.50 to 23.50
No. 1 busheling	13.50 to 14.00
No. 2 busheling	9.50 to 10.00
Cut forge	14.25 to 14.75
Pipes and flues	12.00 to 12.50
No. 1 railroad wrought	15.75 to 16.25
No. 2 railroad wrought	14.25 to 14.75
Steel knuckles and couplers	15.75 to 16.25
Coil springs	16.75 to 17.25
No. 1 cast	19.50 to 20.50
Boiler punchings	18.00 to 19.00
Locomotive tires, smooth	16.50 to 17.00
Machine shop turnings	5.00 to 5.50
Cast borings	8.00 to 8.50
Stove plate and light cast	15.50 to 16.00
Grate bars	15.00 to 15.50
Brake shoes	13.75 to 14.25
Railroad malleable	15.00 to 16.00
Agricultural malleable	14.50 to 15.00
Country mixed	11.00 to 12.00

**Rails and Track Supplies.**—It is expected that purchases of rails by the Railroad Administration will stimulate the market for track fastenings, but as yet activity is confined to buying for pressing needs. We quote:

Standard railroad spikes, 3.35c., Pittsburgh. Track bolts with square nuts, 4.35c., Pittsburgh. Steel tie plates and iron angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.75c., f.o.b. makers' mills. Light rails, 2.45c., f.o.b. makers' mills, with usual extras.

We quote 30 to 45-lb. rails at 2.45c.; 16 to 20-lb., 2.49½c., and 12-lb. at 2.53½c., in carloads and larger lots f.o.b. Pittsburgh.

**Bolts and Nuts.**—The demand is general and steadily improving. It is estimated that business is close to 65 per cent of normal at present, with every prospect of a better showing in the ensuing weeks. The purchase of rails by the Railroad Administration at the "stabilized" prices has tended to clear the atmosphere. Jobbers

apparently no longer hope for further reductions and are beginning to lay in larger stocks. Among individual industries the automobile manufacturers are buying heavily. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1476. Jobbers quote:

Structural rivets, 4.72c.; boiler rivets, 4.82c.; machine bolts up to ¾ x 4 in., 50 and 10 per cent off; larger sizes, 40 and 10 off; carriage bolts up to ¾ x 6 in., 50 and 10 off; larger sizes, 40 off; hot pressed nuts, square tapered and hexagon tapered, \$2 off; coach or lag screw, gimlet points square heads, 50 and 10 per cent off. Quantity extras for nuts are canceled.

**Cast Iron Pipe.**—Brainerd, Minn., has awarded from 1000 to 2000 tons to the United States Cast Iron Pipe & Foundry Co. Duluth has let 500 tons to the National Cast Iron Pipe Co. and Minneapolis awarded 500 tons to the American Cast Iron Pipe Co. Chicago opened bids to-day on 1000 tons and Elyria, Ohio, received bids on 300 tons on May 22.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., \$54.80; 6-in. and larger, \$51.80, class A and gas pipe, \$1 extra.

## Philadelphia

PHILADELPHIA, May 27.

While there are some signs of improvement in the steel situation, they are as yet only straws which may indicate the trend which business will now take. Nothing approaching a real buying movement is apparent, yet some of the signs are encouraging. For example, some consumers who have not been in the market since the armistice was signed have sent in small orders in the past week for various steel products. Another favorable sign is the willingness of some consumers to make contracts for three or six months, though in practically all instances they ask for protection against price declines. One large interest is making six months' contracts and is giving assurances that customers will be protected if prices go down. This promise is not put in writing, customers merely being told that the company's policy will be in the future the same as it has been in the past, when unfilled tonnages were shipped at reduced prices.

Although many steel companies are rigidly maintaining the prices announced by the Industrial Board on March 21, it cannot be said that this policy is uniform. Makers of blue annealed sheets have in several instances sold Nos. 10, 11 and 12 gage on the 2.65c. plate basis, with 20 per cent extra, or a net price of 3.18c., Pittsburgh, for No. 10 gage. This price-cutting was started by a mill which sold light unannealed plates on the plate basis to compete with blue annealed sheets, and the sheet makers were forced to meet the cut to retain their business. Some fabricators have been able to shade the price on shapes by \$2 a ton. No further price cutting on plates has been reported since a locomotive company, as reported last week, bought 3000 tons at 2.50c., Pittsburgh. One Eastern mill has sold a few small tonnages of plates at 2.75c., Pittsburgh. Billets for export are reported to have been sold at \$3 or \$4 a ton under the \$38.50 base.

The pig iron market is inactive, with some small concessions on foundry iron being made. A marked reduction on basic iron undoubtedly could be obtained if an attractive tonnage were offered. Producers of ferromanganese have reduced their asking price to \$125 per ton for 78 to 82 per cent.

**Pig Iron.**—Foundry iron business is in light volume and there is no demand for steel-making iron. Consumers of basic in the East are well supplied with iron and no important transactions are expected in the immediate future. While our quotation on basic delivered in the Philadelphia district is nominally \$29.65, there is no question that this price would be substantially reduced if an attractive tonnage were offered. Those sellers of foundry iron who are anxious for business are no longer attempting to quote prices on a Pittsburgh basis. A few furnaces are quoting \$28, furnace, for No. 2 X iron. In one instance, this would make the delivered price of the iron in Philadelphia or vicinity \$29.30 a ton. Inquiry from England totalling several thousand tons, principally foundry grades, has been re-

ceived here, but it seems impossible to do any business with England at present, as there is an advantage in favor of British makers of about \$8 a ton. We quote standard grades of iron delivered in the Philadelphia district as follows, except that low phosphorus grades are quoted f.o.b. furnace:

Eastern Penna. No. 2 X (2.25 to 2.75 sil.)	\$29.50 to \$31.90
Eastern Penna. No. 2 plain (1.75 to 2.25 sil.)	28.50 to 30.65
Virginia No. 2 X (2.25 to 2.75 sil.)	31.60
Virginia No. 2 plain (1.75 to 2.25 sil.)	30.60
Basic	29.65
Gray forge	28.55 to 29.65
Standard low phosphorus (f.o.b. furnace)	46.75
Copper-bearing low phosphorus (f.o.b. furnace)	43.75

**Ore.**—Manganese ore shipments on old contracts continue to come in, 1450 tons from Brazil, valued at \$45,240, having been received at this port last week.

**Ferroalloys.**—Producers of ferromanganese have changed their asking price to \$125 a ton delivered for 78 to 82 per cent, with a reduction of \$1.75 per unit below 78 per cent on lower manganese content. Very little business is being done, but producers regard the situation as better in that most of the resale material, which has recently disturbed the producers' market, has been disposed of. While producers are asking about \$35 a ton, f.o.b. furnace, for 18 to 22 per cent spiegeleisen, resale lots are still available at around \$30, which is said to be below cost of production. Demand is very light.

**Billets.**—Domestic demand for billets is almost nil, but a few inquiries for export have been circulated. Some export business is said to have been negotiated at about \$3 to \$4 a ton under the \$38.50 price quoted to domestic consumers. We quote open-hearth rerolling billets at \$42.50, delivered Philadelphia district.

**Plates.**—Except for the cut to 2.50c., Pittsburgh, on 3000 tons of plates bought by a locomotive company, as published last week, no concessions in plate prices are reported. One large company has been reinstating some old orders at prices lower than 2.65c., and this has led to reports of further price cutting. An Eastern mill whose quotation is 2.75c., base, Pittsburgh, has made a few sales at this price and has turned away business offered at 2.65c. Some consumers, particularly boilermakers, who have not been heard from since the armistice was signed, have come into the market for small lots, and in a few instances have indicated a willingness to make contracts for three or six months. However, consumers expect to be guaranteed against a reduction in price, and this some mills will not agree to do, although oral promises have been made that customers will be "taken care of" in the event of lower prices as has been the custom of certain companies in the past. Several export inquiries for plates are under negotiation, and one or two large export tonnages are held up awaiting only the financial arrangements. There is more confidence that export business in plates, especially from Japan, will soon assume large proportions. We quote sheared plates, ¼ in. and heavier, at 2.895c., Philadelphia.

**Structural Material.**—Makers of structural shapes report a better demand from fabricators, and the beginning of a building movement is believed to be here, although the total tonnage booked thus far in this market is not large. We quote plain material at 2.695c., Philadelphia, although this price is reported to have been shaded 10c. per 100 lb. by an Eastern mill on two recent building jobs.

**Sheets.**—The blue annealed sheet market has been somewhat demoralized by the action of certain Ohio mills in quoting Nos. 10, 11 and 12 gages on a plate basis. This price cutting was started by one mill which offered unannealed tank steel plates at the plate price, plus a 20 per cent extra, making the net price 3.18c., Pittsburgh. Three mills in the Pittsburgh-Youngstown district met this competition by offering annealed sheets of the same gages at the same price. An Eastern mill was obliged to meet this price or lose its customers. The present situation is that blue annealed

sheets of the heavy gages can be obtained on the plate basis, while lighter gages continue to be sold on the sheet basis. We quote No. 10 blue annealed at 3.425c. to 3.795c.; No. 28 black, 4.595c., and No. 28 galvanized, 5.945c., all Philadelphia.

**Bars.**—A better demand for steel bars is noted and some consumers are willing to make contracts for three or six months, but in most cases ask for a guarantee against declines. The new Du Pont Hotel at Atlantic City will be built of reinforced concrete, and a good-sized tonnage of reinforcing bars will be required. There has been some export demand for bar iron, but the domestic market is extremely quiet. Two Eastern bar iron mills which were recently shut down on account of strikes are still inactive, and one of them has notified its customers of its willingness to substitute steel bars, cancel the orders or keep them in suspension. We quote soft steel bars and bar iron at 2.595c., Philadelphia, with double refined bar iron 1c. per lb. higher.

**Old Material.**—An Eastern steel plant last week bought 5000 tons of machine shop turnings for open-hearth use at \$11 a ton, delivered. This was the only important sale of the week. Trading is at a minimum, but dealers and brokers are optimistic, believing that upon the first indications of buying by the mills prices will advance at least \$2 or \$3 a ton. We quote for delivery at consumers' works, eastern Pennsylvania, as follows:

No. 1 heavy melting steel	\$15.00 to \$15.50
Steel rails, rerolling	17.50 to 18.00
No. 1 low phosphorus, heavy, 0.04 and under	22.00 to 23.00
Iron rails	20.00 to 22.00
Carwheels	20.00 to 21.00
No. 1 railroad wrought	21.00 to 22.00
No. 1 yard wrought	19.00 to 20.00
Country yard wrought	12.00 to 15.00
No. 1 forge fire	12.00 to 13.00
Bundled skeleton	12.00 to 13.00
No. 1 busheling	15.00 to 16.00
No. 2 busheling	13.00 to 14.00
Turnings (short shoveling grade for blast furnace use)	11.00 to 11.50
Mixed borings and turnings (for blast furnace use)	9.50 to 10.00
Machine-shop turnings (for rolling mill use)	11.00 to 11.50
Cast borings (clean)	12.50 to 13.50
No. 1 cast	21.50 to 22.50
Grate bars	17.00 to 18.00
Stove plate	17.00 to 18.00
Railroad malleable	18.00 to 19.00
Wrought iron and soft steel pipes and tubes (new specifications)	17.50 to 18.00
Ungraded pipe	13.00 to 14.00

## St. Louis

ST. LOUIS, May 26.

**Pig Iron.**—While there seems to be a better disposition toward buying in the market, it is almost entirely confined to immediate needs or arranged to cover actual contracts which have been taken on a basis of existing prices. In consequence there has been no large purchasing, either for at once or future delivery. Aside from the tendency already noted on the part of Southern furnaces to equalize the differential between Northern and Southern iron created by the fixed prices of the past and the freight rates from Northern and Southern points, there has been no change in the market situation so far as prices are concerned.

**Coke.**—No business is being done in coke, as melters have no needs that cannot be covered by stocks on hand or existing contracts, while domestic supplies carried over will take care of fuel coke needs for some time.

**Finished Iron and Steel.**—There is a growing tendency to buy finished products, though in small quantities for immediate needs, but this, as in the pig iron market, is believed to be due to the general pressure of good business, causing the development of needs that must be filled. However, there is nothing apparent in the situation to indicate any really large demand or the placing of contracts of consequence for future delivery. Movement out of warehouse is reasonably

steady and for stock out of warehouse we quote as follows:

Soft steel bars, 3.44c.; iron bars, 3.44c.; structural material, 3.54c.; tank plates, 3.74c.; No. 8 blue annealed sheets, 4.59c.; No. 10 blue annealed sheets, 4.64c.; No. 28 black sheets, cold rolled, one pass, 5.44c.; No. 28 galvanized sheets, black sheet gage, 6.79c.

**Old Material.**—Dealers are still playing cautiously with scrap, although there is a better feeling prevalent in the market. However, prices are not being marked up, as none of the handlers of scrap are disposed to make any plunges in either direction. They are awaiting the development of the so-called open market in the pig iron and finished products field, and in the meantime do not appear to want to play the market from either the short or the long side. Broadly speaking, however, the disposition is to be optimistic, because of the good general business which is being done and which the dealers expect to have effect ultimately upon the iron and steel situation. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	\$21.50 to \$22.00
Old steel rails, rerolling	17.00 to 17.50
Old steel rails, less than 3 ft.	16.00 to 16.50
Relaying rails, standard sections, subject to inspection	34.00 to 37.00
Old carwheels	19.50 to 20.00
No. 1 railroad heavy melting steel	15.00 to 15.50
Heavy shoveling steel	13.00 to 13.50
Ordinary shoveling steel	12.50 to 13.00
Frogs, switches and guards, cut apart	15.00 to 15.50
Ordinary bundled sheets	8.50 to 9.00
Heavy axle and tire turnings	9.50 to 10.00
Per Net Ton	
Iron angle bars	\$15.50 to \$16.00
Steel angle bars	13.00 to 13.50
Iron car axles	26.50 to 27.00
Steel car axles	21.50 to 22.00
Wrought arch bars and transoms	19.50 to 20.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	13.50 to 14.00
Railroad springs	13.00 to 13.50
Steel couplers and knuckles	14.00 to 14.50
Locomotive tires, 42 in. and over, smooth inside	15.00 to 15.50
No. 1 dealers' forge	10.50 to 11.00
Cast iron borings	8.00 to 8.50
No. 1 busheling	13.00 to 13.50
No. 1 boiler cut to sheets and rings	10.50 to 11.00
No. 1 railroad cast	19.50 to 20.00
Stove plate and light cast	14.50 to 15.00
Railroad malleable	13.00 to 13.50
Pipes and flues	12.00 to 12.50
Heavy railroad sheet and tank	10.50 to 11.00
Railroad grate bars	12.00 to 12.50
Machine shop turnings	7.00 to 7.50
Country mixed	11.50 to 12.00
Uncut railroad mixed	12.50 to 13.00
Horseshoes	16.00 to 16.50

## Birmingham

BIRMINGHAM, ALA., May 27.

Sales of pig iron in the South are still of the one and two-carlot variety, though every now and then an inquiry comes in for a substantial tonnage. The expectations now are high strung and belief is that within another week buying will start in for the last half of the year. Effort is being made to resist the general report that sales have been made or business accepted in this district with the freight to Chicago absorbed. The general statement is that the lowest quotation at which a little iron has been sold is \$25 per ton Birmingham, No. 2 foundry, by a company which has absorbed the freight at a central point between Chicago and Birmingham. There is talk of two more furnaces being closed down in this district which will further reduce the make around 400 tons per day. The fact that many of the smaller consumers of iron in the Southern territory are melting more iron, while larger machine shops and foundries and pipe plants are getting in some business that has promising aspects, strengthens the pig iron market. Sales into the Middle West have not been of any consequence recently. This indicates that the reports as to the freight absorption have not developed much business. Louisville, Ky., is said to have bought 1500 tons of iron in this district under the fixed price, \$26.75, No. 2 foundry, but it is

asserted in several offices that there will be no concessions on the last half business. All sales now are practically for immediate delivery. Accumulated stocks of iron in this district June 1, including the basic, will be around 200,000 tons, it is estimated now. The Republic Iron & Steel Co. has one of three furnaces going, the Sloss-Sheffield Steel & Iron Co. two out of seven, the Alabama Co. one out of four, Tennessee Coal, Iron & Railroad Co. eight out of fourteen going, Woodstock has one. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, 1.75 to 2.25 silicon.....\$26.75  
Basic ..... 25.75

**Cast Iron Pipe.**—Cast iron pipe plants are melting a little more freely as some business comes in. Expectations now are for an impetus in the business, as prices have been modified a little again. Specifications are to be heard of in several directions and there is expectation of enough business coming in shortly to provide for return to normal conditions.

**Old Material.**—Scrap iron and steel prices remain unchanged this week, but dealers assert that the figures given are just normal. We quote per gross ton, f.o.b. Birmingham district yards, prices to consumers as follows:

Steel rails	\$12.00 to \$14.00
No. 1 heavy steel	12.50 to 13.50
Cast iron borings	6.50 to 7.00
Machine shop turnings	6.50 to 7.00
Stove plate	15.00 to 16.00
No. 1 cast	20.00 to 22.00
Carwheels	20.00 to 21.00
Tramcar wheels	20.00 to 22.00
Steel axles	18.00 to 20.00
No. 1 wrought	12.00 to 14.00

## Buffalo

BUFFALO, May 26.

**Finished Iron and Steel.**—The week just closing has been the most encouraging since the armistice, both as regards improvement in feeling, enlarged inquiry and increased sales and specification. Buyers that have been holding off in the belief that there was a possibility of prices going lower are now apparently convinced that there is no likelihood of their receding and that the bottom has been reached. Hence they are buying and specifying with greater freedom, including structurals as well as bars and plates. Business in plates is looking up. One mill in the district has just received two inquiries for 1,500 tons each for shipbuilding plates and is now working to capacity on orders. The market for wire goods is exceedingly brisk, and one local mill is running to capacity, day and night, turning out 150 tons of wire daily and 1200 kegs of nails. The United States Light & Heat Corporation, Niagara Falls, N. Y., has awarded a contract to the John W. Cowper Co., Fidelity Building, Buffalo, for plant additions taking something over 100 tons of structural steel.

Prices, f.o.b. Buffalo, are as follows: Steel bars, 3.40½c.; iron bars, 4.10½c.; shapes, 3.50½c.; plates, 3.70½c.; No. 10 blue annealed sheets, 4.60½c.; No. 28 black, 5.65½c.; No. 28 galvanized sheets, 7.00½c. For "store door delivery" add 0.04½c. to each commodity.

**Pig Iron.**—The improvement in the pig iron market which seemed to set in about 10 days ago has continued during the past week with added momentum. Consumers generally are becoming more and more interested with reference to their future needs, and, while some are purchasing for only early requirements, inquiry for shipments during the last six months of the year is steadily on the increase. Shipments from furnaces have been remarkably good during the week and there has been no further curtailing of production in this district. Optimism on the part of the furnacemen has increased, based on these better conditions, and the opinion is expressed that within a few weeks the situation in iron and steel circles ought to show gratifying improvement. One furnace interest reports an aggregate inquiry of 20,000 tons of foundry grades for the week, another an aggregate of 10,000 tons, which would indicate that something like real buying will soon begin to characterize the market instead of

the hand-to-mouth system that has been prevalent so long. There is some talk that higher prices may develop, based on increased cost of production; and one producing interest has stated that it will sell only to the end of the first half at present prices. Coke continues irregular in price, but a firming up is expected soon, as demand is good and prices at their present level are unprofitable to the producer. It is likely an advance will be made at the first opportunity. The schedule of prices is as follows, f.o.b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 silicon.....	\$29.75
No. 2 X, 2.25 to 2.75 silicon.....	28.00
No. 2 plain foundry, 1.75 to 2.25 silicon.....	26.75
Gray forge.....	25.75
Malleable, silicon not over 2.25.....	27.25
Basic.....	25.75
Basic, 1 to 1½ per cent manganese.....	26.25
Basic, 1½ to 2½ per cent manganese.....	26.75
Bessemer.....	27.95
Large Superior charcoal, regular grades, f.o.b. Buffalo.....	32.35

**Old Material.**—The week's buying of scrap materials has not come up to dealers' expectations of a week ago. They looked for a marked increase in demand owing to the revived interest in finished products, but the steel mills evidently have not yet taken on sufficient business to warrant renewed buying of scrap, undoubtedly having enough stock on hand in most lines to keep them going for a while without further buying. Transactions have been very light and the market has eased off into a state of dullness. There has been no change whatever in the price schedule and we quote dealers' asking prices the same as a week ago, as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel, regular grades.....	\$14.00 to \$15.00
Low phosphorus, 0.04 and under.....	21.00 to 22.00
No. 1 railroad wrought.....	19.00 to 19.50
No. 1 machinery cast.....	21.00 to 22.00
Iron axles.....	23.00 to 24.00
Steel axles.....	23.00 to 24.00
Carwheels.....	21.00 to 22.00
Railroad malleable.....	17.00 to 18.00
Machine shop turnings.....	7.00 to 7.50
Heavy axle turnings.....	13.00 to 14.00
Clean cast borings.....	11.00 to 12.00
Iron rails.....	21.00 to 22.00
Locomotive grate bars.....	16.00 to 17.00
Stove plate.....	18.50 to 19.00
Wrought pipe.....	13.00 to 14.00
No. 1 bushing.....	13.00 to 14.00
Banded sheet stamping.....	11.00 to 12.00

## Cincinnati

CINCINNATI, May 27—(By Wire.)

**Coke.**—The demand for both furnace and foundry coke is improving somewhat, and as far as contract foundry coke is concerned it is now moving forward at a more rapid rate. This does not apply to 72-hr. coke for Cincinnati and vicinity consumers, as many of the foundries here are still tied up on account of labor trouble. There is a growing scarcity in the production of coke in all districts and it is reported that furnace operators are taking notice of this, and that some have quietly made contracts covering their future requirements. If this is correct, it indicates that a number of idle furnaces intend to blow in again within a short period. The nominal price of Connellsville 48-hr. coke is \$4 per net ton at oven and 72-hr. coke from \$5 to \$5.50. Pocahontas and Wise County foundry grades are unchanged around \$6 to \$6.50, and New River prices range from \$7 to \$8.

**Pig Iron.**—Furnaces seem less inclined to make price concessions, especially on strictly last half business. Inquiries are more numerous. The largest one is from a sanitary manufacturing concern that wants 2000 tons of foundry iron for its Louisville plant for June-July delivery. This same firm bought 1000 tons two weeks ago for prompt shipment. The open quotation on foundry iron is \$26.75, but most transactions have been made below this figure. Where the difference in freight rate was not too marked, both Southern and southern Ohio furnaces have absorbed the amount on attractive business, especially where old customers were concerned. However, this practice has not been general. Virginia makers have sold little iron in this territory recently and the cutting down of production

in that district will probably eliminate it as an important competitor here for some time to come. It is estimated by all selling agencies that consumption now exceeds production, so that necessarily furnace stocks are being reduced. Lake Superior charcoal iron is in exceptionally good demand and Ohio silvery irons are also being bought in fair sized tonnages. No change in prices of either one of these irons is noted and makers appear to be holding firmly at the former schedule. Basic melters are either well provided for or they are uncertain as to what their future requirements will be, as none is evincing any interest in the market. The local foundry molders' strike is still unsettled.

Based on freight rates of \$3.50 from Birmingham and \$1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, silicon, 1.75 to 2.25 (base price).....	\$29.35
Southern coke, silicon, 2.25 to 2.75 (No. 2 soft).....	30.60
Southern gray forge.....	29.35
Ohio silvery, 8 per cent silicon.....	42.05
Southern Ohio coke, silicon, 1.75 to 2.25 (No. 2).....	27.55
Basic, Northern.....	27.55
Standard Southern carwheels.....	51.60

**Fluorspar.**—A few quiet tentative inquiries have come out from different sources looking for a future supply, but there is no new business booked for prompt shipment fluorspar. The price for movement before July 1 is unchanged around \$25 at point of shipment.

**Finished Material.**—Many more inquiries are out and as far as structural material is concerned the present open weather may have something to do with it, but it is stated that contractors and builders are very slow in placing orders except for odd lots of material needed for jobs under way. Steel pipe is in good demand, and there is also a better call for cold-rolled shafting. Jobbers are not placing any orders of size at the present time with the mills, and contracts generally contain a stipulation that the market price on the day of shipment is to govern. Some orders for spikes have been booked recently at the price of \$3.35 per keg base, Pittsburgh. A little better business is also reported in galvanized sheets that are unchanged at 5.70c., Pittsburgh, carrying a freight rate to Cincinnati of 23c. per 100 lb.

The following are present local jobbers' prices: Steel and iron bars, 3.33c. base; bands, 4.03c. base; structural shapes, 3.43c. base; plates, ¼-in. and heavier, 3.63c. base; No. 10 blue annealed sheets, 4.53c., and wire nails, \$3.85 per keg base.

**High Speed Steel.**—The past week was a dull one with different selling agencies, although business in sight is said to be very good. However, no average can be made on a weekly basis alone, because of the erratic demand. The quotation to-day on leading standard brands is \$1.60 per lb. base.

**Old Material.**—The steel mills in this territory have lately purchased some scrap, but the amount of these purchases will not by any means come up to the average generally bought at this time of the year. Outside mills are taking practically no interest in the market and inquiries for foundry scrap are considered by dealers simply to obtain information as to market values. As a rule, the foundries are not willing to buy scrap ahead at present prices, but this may be attributed to the fact that most of them have sufficient old material to fill their needs during the next few months. Quotations are a trifle firmer, but no changes are reported from any source. The following are dealers' buying prices in carload lots, f.o.b. yards Southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet.....	\$9.50 to \$10.00
Old iron rails.....	22.50 to 23.00
Relaying rails, 50 lb. and up.....	40.00 to 41.00
Revolving steel rails.....	14.00 to 14.50
Heavy melting steel.....	13.00 to 13.50
Steel rails for melting.....	13.00 to 13.50
Old carwheels.....	15.50 to 16.00
No. 1 railroad wrought.....	14.00 to 14.50
Per Net Ton	
Cast borings.....	\$5.50 to \$6.00
Steel turnings.....	5.25 to 5.50
Railroad cast.....	15.50 to 16.00
No. 1 machinery.....	17.00 to 17.50
Burnt scrap.....	11.00 to 11.50
Iron axles.....	23.00 to 23.50
Locomotive tires (smooth inside).....	14.00 to 14.50
Pipes and flues.....	10.50 to 11.00
Malleable cast.....	11.00 to 11.50
Railroad tank and sheet.....	8.50 to 9.00

## New York

NEW YORK, May 27.

**Pig Iron.**—Sales of pig iron show a very encouraging increase. Although the largest transaction reported was one for 6000 tons of basic by a Buffalo company at \$25.75, furnace, many sales of small tonnages were made, and the aggregate last week doubtless was larger than for any week this year. The sale of basic was for delivery during the last six months, and sales of foundry iron included all deliveries from prompt to last quarter. Sales of two lots of 1000 tons each for export were recorded and a number of tonnages of fair size for export are pending. On one of the 1000-ton lots the full price of \$26.75, Birmingham, for No. 2 foundry was paid and the iron was exported via New Orleans, the destination in Europe not being made public. No Southern iron is being sold in this territory. We quote as follows, delivered New York, for Northern and Southern grades, quotations of the latter being nominal:

No. 1 foundry, silicon, 2.75 to 3.25.....	\$31.55
No. 2 X, silicon, 2.25 to 2.75.....	29.80
No. 2 plain, silicon, 1.75 to 2.25.....	28.55
No. 2 X, Virginia, silicon, 2.25 to 2.75.....	\$31.40 to 32.40
No. 1 Southern, silicon, 2.75 to 3.25.....	37.45
No. 2 Southern, soft (all rail), sil., 2.25 to 2.75.....	35.70
No. 2 Southern (all rail), sil., 1.75 to 2.25.....	34.45

**Ferroalloys.**—Producers are generally asking \$125, delivered, instead of \$150, for 78 to 82 per cent domestic ferromanganese with \$1.75 per unit deducted for metal containing less than 78 per cent. No sales at these levels are reported. It is stated that resale ferromanganese has been done at under \$100. Demand is very light and sales have been limited to carload lots. There is noted an inquiry of 600 tons for delivery at 100 tons per month from July on. Some business has been done in spiegeleisen both of resale metal and of that from producers. It is understood that resale, low analysis spiegeleisen has been sold as low as \$27, delivered, and that one producer is offering the alloy at \$30, furnace. In high grade manganese ore it appears that the best that can be done on Indian grades is 68c per unit, seaboard, at which level some business is reported. Sellers of South American ore are offering their product at the American seaboard at 60c per unit. The only demand for 50 per cent ferrosilicon consists of carload lots for early delivery and some business has been done at \$75 per ton, delivered, which we quote as the market. In ferromanganese, spiegeleisen and in electric ferrosilicon, of 50 per cent and 15 per cent silicon content, export business is reported, but in each case the amount involved has been small.

**Finished Iron and Steel.**—Export business is locally the most active feature of the market, with buying on the part of jobbers also a noteworthy factor in signaling the better feeling of the last two weeks. A willingness to make concessions to secure export orders is still noticeable, a round lot of billets being quoted at \$2 to \$3 a ton below prevailing domestic rates and 200 tons of plates having been sold at 2.55c, Pittsburgh basis. A sale of several thousand tons of rails is said to have gone at only slightly above the \$45-\$47 basis, against the recent \$55-\$57 export quotations. Less need for such concessions now appears in view of an easing up of ocean freight rates. Not only is it possible to get the published minimum rates without great trouble, but reductions of about 10 per cent have been made on various occasions where materials have been available for some unfilled vessel space. In short the Atlantic coast accumulations of material for export have practically disappeared. A noteworthy change in sentiment has accordingly come over the export trade for less is heard of expectation of lower prices, even admitting that a number of mills would like to increase their backlog. An active demand continues for fabricated steel and the atmosphere has been cleared in railroad car manufacturing circles through the adjustment after months of discussion of the contracts for cars for shipment abroad. One lot of 40,000 cars for France has been definitely canceled and a subsequent lot of 20,000 cars has been reinstated. It is probable that these

cars will be sold abroad by the Government whether they are used in whole or in part. For Korea 12 locomotives have been bought. New structural steel projects cover both industrial and public buildings as follows: 1500 tons for the Museum of Fine Arts, Philadelphia; 400 tons for a factory for the McCleary, Wallin & Crouse, Amsterdam, N. Y.; 100 tons for the Boston & Albany, distributed over no less than 58 spans; 400 tons for a paper mill at Fitchburg, Mass., and 200 tons for a small dye mill at Pawtucket, R. I. The American Bridge Co. will supply 500 tons for three buildings for the Standard Oil Co. at Bayonne, N. J.; the Pittsburgh Bridge & Iron Co., 250 tons for the American Metals Corporation, Langeloth, Pa.; the Lackawanna Bridge Co., 1250 tons for the Chicago Pneumatic Tool Co., Franklin, Pa., and the Southern Bridge Co., 300 tons for a highway bridge across the Broad River, S. C. We quote mill shipments as follows: Bar iron, refined grade, 2.62c.; double refined bar iron, 3.62c.; soft steel bars, 2.62c.; shapes, 2.72c.; plates, 2.92c.; all New York.

**Warehouse Business.**—The gradual improvement in business is reflected on the books of jobbers which show up to 20 per cent more orders placed in May than in April, and a corresponding increase in tonnage. For special shapes or sizes there is a small but imperative demand from manufacturers, who show no hesitancy about paying a premium rather than wait for four to six weeks for cheaper new rollings from the mills. A favorable trend for the warehousemen is indicated by a canvass of fabricating shops by a large dealer in shapes, which showed a general reluctance on their part to stock structural material for the reason that the \$15 spread for warehousing does not warrant tying up capital necessary to carry a properly comprehensive supply at the existing scale of prices. Softening tendencies in the market for cold-drawn steel, attributed to the resale of supplies recently disposed of by the Government, has caused a reduction from net list to 5 off list. It is expected that a leading interest which has been quoting discounts on bolts and nuts at 50 off list on sizes over 3/4 x 4 in. up to 1 in. x 30 in. since early in May, will shortly re-establish the 40 and 10 off list, previously prevailing. There has been some complaint that 10 off for warehousing rendered no equitable profit to the dealer. We quote out-of-store as follows: No. 10 blue annealed sheets, 4.57c.; No. 28 black sheets, 5.37c.; No. 28 galvanized sheets, 6.50c.; steel bars, 3.37c.; structural shapes, 3.47c.; plates, 3.67c.; bands, 3/16 in., Nos. 10 and 12, 4.07c.; shafting, 5 off list.

**High Speed Steel.**—New business is practically negligible; and the prospect of any brightening in the local territory is remote, for the reason that the few large local or nearby consumers in many cases have war stocks that will last for months to come at least. Prices average \$1.60 per lb.

**Cast-Iron Pipe.**—Eastern shops have reluctantly reduced prices \$5 per ton in harmony with the action of shops in the Central West which last week announced a reduction of \$5. A fair amount of business is pending, but no large tonnages are expected to be placed in the near future. Municipalities are exceedingly slow about coming into the market. We quote New York prices as follows: 6-in. and heavier, \$52.70; 4-in., \$55.70; 3-in., \$62.70, and \$1 additional for class A and gas pipe.

**Old Material.**—Better feeling, with no better prices, characterizes the situation. Most transactions are in borings and turnings. The better feeling is due to the optimistic predictions made at the recent meeting of the American Iron and Steel Institute. The trade is confident that there will be more demand for raw materials and believes that since pig iron will probably not come down, scrap will go up to meet it to make a fairer difference in price than exists to-day. The main speculation is as to when the rise will take place. New York brokers secured a portion of a fair order for turnings from an eastern Pennsylvania company. Joseph Joseph & Bros. Co. was highest bidder for the 500 tons of car-wheels from the Panama Canal, sold by the Government, its price being \$20.22 per gross ton, New York

harbor, where they will arrive to-day. Prices which brokers and dealers are quoting, New York, follow:

Heavy melting steel .....	\$11.50 to \$12.00
Rerolling rails .....	15.50 to 16.00
Relaying rails, nominal .....	38.00 to 40.00
Steel car axles .....	20.00 to 21.00
Iron car axles .....	25.00 to 26.00
No. 1 railroad wrought .....	19.00 to 19.50
Wrought iron track .....	13.50 to 14.50
Forge fire .....	8.50 to 9.00
No. 1 yard wrought, long .....	16.00 to 16.50
Light iron .....	7.50 to 8.00
Cast borings (clean) .....	8.00 to 8.50
Machine shop turnings .....	7.50 to 8.00
Mixed borings and turnings .....	7.00 to 7.50
Iron and steel pipe (1 in. minimum diameter), not under 2 ft. long .....	13.50 to 14.00
Stove plate .....	14.50 to 15.00
Locomotive grate bars .....	14.50 to 15.00
Malleable cast (railroad) .....	13.00 to 13.50
Old carwheels .....	20.00 to 20.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, are:

No. 1 machinery cast .....	21.00 to 21.50
No. 1 heavy cast (columns, building materials, etc.), cupola size .....	20.00 to 20.50
No. 1 heavy cast, not cupola size .....	14.50 to 15.00
No. 2 cast (radiators, cast boilers, etc.) .....	16.50 to 17.00

## Cleveland

CLEVELAND, May 27.

**Iron Ore.**—The improved condition of the iron and steel market is reflected in the ore market, which has become much more active. Several sales of fairly good sized lots, including two aggregating 140,000 tons and one for over 200,000 tons, were made during the week and a number of good inquiries are pending. Sales were made at regular prices and little talk is now being heard of lower ore prices. Shipments by merchant ore firms are slowly increasing, but the movement for May will be light, as the amount shipped by most interests has been far below normal for the month. Shipments by the Steel Corporation have been fairly heavy. Ore prices delivered f.o.b., lower Lake ports, are as follows:

Old range Bessemer, \$6.45; old range non-Bessemer, \$5.70; Mesaba Bessemer, \$6.20; Mesaba non-Bessemer, \$5.55.

**Coke.**—The improvement in the iron and steel markets has so far not stimulated the coke market. There is practically no demand for foundry coke, but activity is looked for within the next two or three weeks, when the buying movement for the last half is expected to start. Connellsville foundry coke is quoted at \$5 to \$5.50 per net ton at oven for standard makes for prompt shipment.

**Pig Iron.**—A very active demand for foundry pig iron has developed during the past few days. Many sales are reported, mostly in small lots, but several for 1,000 to 1,500 tons. Business was pretty evenly divided between third quarter and last half contracts. There is also increased activity in malleable iron, but no inquiry for steel-making iron. Two Ohio consumers have not yet placed orders for basic iron for which they made inquiry about two weeks ago, and some sellers maintain that in view of the decided improvement in the tone of the market, consumers have waited too long to be able to buy basic iron below the regular price. Prices on foundry iron are firm, although there are occasional reports of slight concessions being made by sellers cutting their differentials for high silicon iron or absorbing a portion of the freight rate. As inquiry for foundry iron is plentiful, sellers look for a further increase in the volume of business. Among new inquiries is one for 4,000 tons of Southern or Northern foundry iron from the National Sanitary Mfg. Co. for its Louisville plant for June and July delivery. Tennessee furnaces have reduced prices on Southern foundry iron \$1 a ton by giving the consumer the benefit of the 90c. differential as compared with the Alabama rate, and an additional 10c. Several sales of Southern foundry iron in lots of 300 to 400 tons were made in this territory for the last half delivery at the new price during the week. There is no evidence in this territory that Alabama furnaces are making any price concession. The Struthers Furnace Co. will blow out for re-

lining its furnace at Struthers, Ohio, early in June. This furnace is operating on basic iron. We quote delivered Cleveland, as follows:

Bessemer .....	\$29.35
Basic .....	27.15
Northern No. 2 foundry .....	27.15
Southern No. 2 foundry, silicon, 2.25 to 2.75 .....	32.00
Gray forge .....	26.15
Ohio silvery, silicon, 8 per cent. ....	42.65
Standard low phos., Valley furnace .....	45.75

**Bolts, Nuts and Rivets.**—Orders for bolts and nuts have improved materially during the past few days. The automobile manufacturers are the heaviest buyers, but considerable business is coming from the jobbers. The improved demand has stiffened prices, and reports of shading by some of the smaller manufacturers are less frequent. Some consumers wish to make contracts and manufacturers will probably take on some contracts for delivery not beyond the third quarter. The demand for rivets has also improved and some consumers wish to make contracts covering the remainder of the year. Some manufacturers may make third-quarter contracts, but not go beyond that. Specifications are coming from shipyards in good volume.

**Old Material.**—There is a much better feeling in the scrap market and an improvement in the demand following the increased activity in the steel market. Prices are a little firmer on heavy melting steel and some of the other more active grades. Dealers are offering as high as \$16 for heavy steel scrap to cover short orders; the supply is not plentiful, as there is a general disposition to hold material for higher prices. A Canton mill is offering \$16 for this grade of material delivered, but the price is not attractive to Cleveland dealers. Dealers say they will hold their yard stocks of heavy melting steel for a \$20 price. Dealers are offering \$9 for turnings, delivered to Valley mills. The demand for cast scrap has improved somewhat. Busheling scrap is still inactive. We quote delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel .....	\$15.50 to \$16.00
Steel rails, under 3 ft. ....	15.75 to 16.00
Steel rails, rerolling .....	16.00 to 17.00
Iron rails .....	23.00 to 24.00
Iron car axles .....	29.50 to 30.00
Steel car axles .....	27.50 to 28.50
Low phosphorus melting scrap .....	16.25 to 17.00
Cast borings .....	9.75 to 10.25
Iron and steel turnings and drillings .....	8.50 to 9.00
Compressed steel .....	13.00 to 13.50
No. 1 railroad wrought .....	17.00 to 17.50
Cast iron carwheels .....	22.00 to 22.50
Agricultural malleable .....	14.00 to 15.00
Railroad malleable .....	17.00 to 18.00
Steel axle turnings .....	13.50 to 14.00
Light bundled sheet scrap .....	11.00 to 11.50
No. 1 cast .....	22.00 to 22.50
No. 1 busheling .....	13.75 to 14.25
Drop forge flashings, 10 in. and under .....	13.00 to 13.50
Drop forge flashings, over 10 in. ....	9.50 to 10.00
Railroad grate bars .....	16.50 to 17.00
Stove plate .....	17.00 to 18.00

## Demand Six-Hour Day

YOUNGSTOWN, OHIO, May 27.—Managers of sheet mills here have received from national headquarters of the Amalgamated Association of Iron, Steel and Tin Workers in Pittsburgh the text of the 1919-1920 wage scale as adopted at the Louisville (Ky.) convention. Sheet workers ask for a 6-hr. turn, four turns on each mill. It is argued the work is so strenuous the 9-hr. day is too long. Some of the crew, such as the heater, pair heater, matchers and doublers, must be at the mill 30 minutes before the rolls start to get their heats in and the iron charged. It is claimed to offset this wage reduction that would follow the men propose an advance of 25c. per ton on the base rate. For a long period, puddlers worked six hours at the Girard plant of the A. M. Byers Co.

There are now 388 manufacturing plants in Canada which are connected with similar concerns in the United States, according to a list collected by *The Monetary Times*, Toronto. The total investment in these plants is estimated at \$264,939,592. In the case of 76 of the companies the actual paid up capital has been obtained, being \$51,895,350, an average of \$682,834.

## British Iron and Steel Market

### Labor Conditions Grave—Pig Iron Scarce and Higher—American Tin-Plate Cheaper

(By Cable)

LONDON, ENGLAND, May 23.

Labor conditions are increasingly grave owing mainly to idleness. It is officially stated that it may be necessary to reduce the supply of coal to industry, the output per head continuing to decrease irrespective of working hours.

The pig-iron scarcity increases. For Cleveland foundry iron £8 has been paid for prompt shipment and asked for third and fourth quarters. The export demand is unsatisfied owing to scarcity of iron. Hematite iron is almost unprocureable and £9 5s. has been paid by the domestic trade.

The tin-plate market is quiet and the Swansea dock strike has been ended. America is willing to accept 31s. (\$7.19) for big line oil sizes for the East, Welsh makers asking 34s., but efforts are being made to induce the acceptance of the American price here. American 4-in. billets for May-July shipment have been sold at \$63 c.i.f.

The output of steel ingots and castings in the United Kingdom in 1918 was 9,591,428 gross tons.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalents figured at \$4.64 for £1:

Pig iron:	f	s.	d.	
West Coast Bessemer	9	5	0	\$42.92
Cleveland No. 3 foundry	8	0	0	37.12
Coke (Durham):				
Furnace	1	19	0	9.05
Foundry	2	4	0	10.21
Ferromanganese	30	0	0	139.20
Billets	14	10	0	67.28
Tin plate and sheet bars	13	15	0	63.80
Rails, 60 lb. and upward	15	0	0	69.60
				Per lb.
Steel bars	19	0	0	3.93c.
Large rounds, etc.	17	2	6	3.54c.
Structural material	16	10	0	3.42c.
Plates	17	0	0	3.52c.
Plates, boiler	19	5	0	3.99c.
Bar iron	20	10	0	4.24c.
Tin plates, 14 x 20, coke	1	14	0	\$7.89
112 sheets, 108 lb., f.o.b. Wales.				

\*For export £1 more is asked per ton, a price thus of 3.72c. per lb.

### Export Pig-Iron Inquiry Better but Output Inadequate—Steel for Ships Eagerly Sought

(By Mail)

LONDON, ENGLAND, April 28.—The removal of control on the sale and distribution of commodities at the end of May has already been announced in this column by cable. Imports and exports are the subject of special action by the government authorities and are not covered by this announcement.

A record has been established for Great Britain by a 60-ton furnace at Frodingham, Lincolnshire, in turning out 1103 tons 18 cwt. of mild steel in a week. The average weekly output of pig iron, steel ingots and castings in the United Kingdom was as follows, in gross tons:

	Pig Iron	Steel Ingots and Castings
October, 1918	177,000	205,000
November, 1918	162,000	149,000
December, 1918	157,000	127,000
January, 1919	149,000	154,000
February, 1919	156,000	156,000
March, 1919	156,000	174,000

### New Rennerfelt Furnace Installations

Hamilton & Hansell, New York, announces the sale of the following Rennerfelt Electric furnaces:

A 1000-lb. furnace, 400 kva. to the Steel Alloys Co. of America, Bayway, Elizabeth, N. J., to be used for the reduction of tungsten-acid to metallic tungsten.

A 1000-lb. furnace, 200 kva. to the British American Nickel Co., Ottawa, Canada, to be installed at their Deschene plant in Quebec. The furnace will be used for melting nickel.

A 150 kva., single phase pot furnace with its complete equipment, to the government of the Netherlands, Colonial Department. This furnace will be erected at their experimental station in Batavia, Java, Dutch East Indies.

## IRON AND INDUSTRIAL STOCKS

### Trading and Strength of Quotations Set New High Records Over a Long Period

NEW YORK, May 26.

A remarkably strong market was established in the closing days of last week, notwithstanding some earlier hesitancy predicated on the passing phases of peace negotiations. Steel common on Saturday reached a new high 1919 level of 107%, a net gain of 4% points for the week. The largest market in a number of years was reached to-day, when nearly 2,000,000 shares were traded in with steel and automobile issues prominent. On the strength of good buying of the metal, copper shares were active and strong, Anaconda advancing to over 71.

The range of prices in active iron and industrial stocks from Tuesday of last week to Wednesday of this week was as follows:

Allis-Chalm. com.	39 1/2 - 46 1/2	La Belle Ir. com.	103 -
Allis-Chalm. pf.	92 1/2 - 95	La Belle Ir. pf.	120 1/2 -
Am. Can. com.	54 1/4 - 60 3/4	Lackaw. Steel	78 1/2 - 84 1/2
Am. Can. pf.	102 1/2 - 104 1/2	Lake Sup. Corp.	19 1/2 - 21 1/2
Am. Car & F. com.	101 1/2 - 104 1/2	Lima Loco.	50 - 56 1/2
Am. Car & F. pf.	116 3/4 - 51	Midvale Steel	47 1/2 - 52 1/2
Am. Loco. com.	80 - 85 1/2	Nat.-Acme	35 3/4 - 37 1/2
Am. Loco. pf.	107 - 107 3/4	Nat. E. & St. cm.	62 1/2 - 69
Am. Radiator cm.	290 - 300	Nat. E. & St. pf.	102 - 104
Am. Ship. com.	130 1/4 - 132	N. Y. Air Brake	119 1/2 - 124
Am. Stl. Fdries.	34 3/4 - 39	Nov. Scotia Steel	67 1/2 - 75 1/2
Bald. Loco. com.	99 1/4 - 103	Pittsb. Steel pf.	90 - 97 1/2
Bald. Loco. pf.	105 3/4 - 107	Pressed Stl. com.	79 1/2 - 81 1/2
Beth. Steel com.	75 3/4 - 80 3/4	Ry. St. Spg. com.	89 1/2 - 92 1/2
Beth. steel cl. B.	76 - 80 3/4	Republic com.	85 1/2 - 89 1/2
Case, J. L. pf.	99 1/4 - 100	Republic pf.	103 1/2 - 104
Cent. Fdry. com.	23 - 24	Sloss com.	57 1/2 - 65 1/2
Cent. Fdry. pf.	49 1/2 - 51	Sloss pf.	90 - 91 1/2
Chic. Pneu. Tool.	75 - 78 1/2	Superior Steel	43 - 50 1/2
Colo. Fuel	45 1/2 - 48	Transw-Williams	51 - 58 1/2
Cru. Steel com.	73 1/2 - 82	Un. Alloy Steel	51 1/2 - 55
Cru. Steel pf.	97 - 100	U. S. Pipe com.	25 1/4 - 27 1/2
Gen. Electric	164 - 168	U. S. Pipe pf.	64 -
Gt. No. Ore. cert.	46 1/4 - 47 3/4	U. S. Steel com.	102 - 109 1/2
Gulf States Steel	68 - 75 1/4	U. S. Steel pf.	115 1/2 - 117 1/2
Glf. S. Stl. 1st pf.	95 1/2 - 95 1/2	Va. L. C. & Coke	66 1/2 - 68
Int. Har. com.	130 - 132 1/2	Westingh. Elect.	55 1/2 - 59 3/4
Int. Har. pf.	119 - 117		

### Dividends

The Harbison-Walker Refractories Co., quarterly, 1 1/2 per cent on the common, payable June 2.

The Republic Iron & Steel Co., quarterly, 1 1/2 per cent on the common, payable Aug. 1, and 1 1/4 per cent on the preferred, payable July 1.

### New Building Projects

CHICAGO, May 28—(By Wire).—The viaduct to be built by the Pennsylvania Railroad in Twelfth Street in connection with the Chicago Union Station program will be a reinforced concrete structure like the Burlington viaduct in Canal Street, but will involve about 300 tons of fabricated steel. Bids will be taken the end of the week on 700 tons for the Federal Reserve Bank, Dallas, Texas. Fabricators are now figuring on 300 tons for the Robert Dollar Building, San Francisco. The Austin Co., Cleveland, has the general contracts for plants to be built by the Liberty Motor Car Co. at Detroit and by the Novo Engine Co., Lansing, Mich. The fabricating work for the former, involving 300 tons, will be done by the Central States Bridge Co., Indianapolis, whereas the steel for the Novo Engine Co., amounting to about 200 tons, has not yet been let. The Hamilton Mfg. Co., Two Rivers, Wis., will take bids this week on 150 tons. The Insley Mfg. Co., Indianapolis, will fabricate 250 tons for the Manufacturers' Building to be erected in that city. Among the projects contemplated is the Chamber of Commerce Building, Minneapolis, a 12-story structure, and a hotel at Fort Worth which will involve 2000 to 3000 tons.

### Importing Tin Ores

WASHINGTON, May 27 (By wire).—The War Trade Board announced that it will hereafter consider applications for licenses to import tin ores and tin concentrates, subject, however, to the condition that such licenses will permit the importation only of shipments made from point of origin on or after June 8, 1919, and that such import licenses will not be valid for entry until July 1, 1919.

## OPEN SHOP POLICY

### Judge Gary Tells Amalgamated President It Will Be Maintained

The United States Steel Corporation will continue its open shop policy according to a letter which Judge E. H. Gary, chairman of the board, sent in reply to a letter from M. F. Tighe, international president Amalgamated Association of Iron, Steel and Tin Workers. Mr. Tighe, in his letter dated Louisville, Ky., May 15, referred to the disturbing elements in the industrial world at the present time, saying that the spirit of unrest has become more and more acute. He then said:

It is the judgment of the representatives of the Amalgamated Association that it is the patriotic duty of all good citizens to use their every effort to stem the tide of unrest if possible.

The Amalgamated Association of Iron, Steel and Tin Workers have admitted many thousands of the employees of the United States Steel Corporation into their organization. These members are asking that they be given consideration by the corporation you are the honorable Chairman of in their respective crafts and workings, and also as law-abiding citizens who desire the privilege of having their representative meet with the chosen representatives of the corporation you represent to jointly confer on questions that mutually concern both. Sincerely believing that the granting of their request on your part will not only be the means of allaying that unrest, but will also promote and insure that harmony and co-operation that should at all times exist between employer and employees, to the end that all will share in the glorious triumphs so lately achieved in the war, thereby adding still more to the lustre and glory of our common country.

Trusting that you will give this request on the part of the employees of the aforesaid corporation your most earnest consideration, I await your pleasure.

Judge Gary's reply follows:

United States Steel Corporation, New York,  
May 29, 1919.

Dear Sir:

I have read with interest your letter of May 15.

I agree that it is the patriotic duty of all good citizens to use their efforts in stemming a tide of unrest in the industrial world whenever and wherever it exists.

As you know, we do not confer, negotiate with, or combat labor unions as such. We stand for the open shop, which permits a man to engage in the different lines of employment whether he belongs to a labor union or not. We think this attitude secures the best results to the employees generally and to the employers.

In our own way, and in accordance with our best judgment, we are rendering efficient patriotic service in the direction indicated by you.

With kind regards, I am,

Yours respectfully,

(Signed) E. H. GARY,

Chairman.

Mr. M. F. Tighe, international president Amalgamated Assn. of Iron, Steel and Tin Workers, Pittsburgh.

### The Amalgamated Association Asks Higher Rates

The recent annual convention of the Amalgamated Association of Iron, Steel and Tin Workers convened in Louisville, Ky., on Tuesday, May 6, and adjourned on Friday, May 23. It is said the representation at this meeting was the largest for some years, the association having very largely increased its membership in the past year or two, by being able to enforce its scales at some sheet and tin mill plants that for years have been operated on a non-union basis. Very little gain was made among mills that roll iron bars, there being so few of these in the country. The new scale for puddling to be presented to the mills for signature for the year commencing July 1, next, calls for an advance over the present scale, which expires June 30. The puddling scale is based on the bar iron card, and under the terms of the present scale, when the average price of bar iron is 1.30c., puddling is \$6.50 per ton. Under the new scale, when bar iron is 1.30c., the price of puddling is to be 5 per cent higher, and this continues until 1.80c. is reached on iron bars, when the advance for boiling is to be 10 per cent. A straight advance of 25 per cent on the present sheet and tin mill scales is asked for in the new scales, to be effective from July 1. The minimum basis of the new sheet mill scale is 4.35c. for Nos. 26, 27 and 28

gage plain sheet steel, while the basis of the present scale, which expires on June 30, for these gages is 2.15c. The basis of the tin mill scale has been made \$7 per base box, instead of \$3.50 as in the present scale, which also expires on June 30. It is very evident that sheet and tin mill workers who are members of the Amalgamated Association do not expect very much lower prices on sheets, from the fact that they have advanced the minimum basis of the sheet mill scale from 2.15c. to 4.35c., an advance of over 100 per cent, and the tin mill scale from \$3.50 per base box to \$7.00 per base box, a straight advance of 100 per cent. It is very probable that those manufacturers of sheets and tin plate who sign the Amalgamated scale will oppose seriously not only the new basing rates, but also the stiff advance asked in wages due to these new basing rates. A meeting of conference committees from the Amalgamated Association and sheet and tin plate manufacturers is to be held in Atlantic City on June 16, and a similar meeting of the conference committee and bar iron mills, which sign the Amalgamated scale is to be held in Atlantic City June 23.

### Worcester Strike Continues

The molders' strike at Worcester, Mass., continues with little change. The foundrymen are determined not to grant the demands of the Molders' Union for a shorter day and increased minimum wage, and it is unlikely that when the foundries are running again they will be under union domination. The owners state that they will accept the opportunity to return to an open-shop basis.

The Colvin Foundry, open shop, is actually taking on additional hands, as compared to the working force as it was before the trouble began, and is accepting more work. The Holyoke Machine Works is operating its foundry with a reduced force, and so, too, is the Reed, Prentice Co., which, though open shop, has lost men because of the threatening attitude of the strikers toward the non-union molders.

The issue has come down to one of endurance. The foundrymen know their customers are not suffering for lack of castings, and are in no hurry to resume operations. The matter had to be fought out sooner or later, and the present is considered a propitious time.

### In the World of Labor

As part of a nation-wide campaign to secure the naturalization of foreign-born employees, the Department of Labor, Washington, has asked all industries to question their employees concerning their desire to become naturalized, or to complete their naturalization if they have taken out their first papers.

The strike of craftsmen in the building trades at Youngstown, Ohio, was settled after 19 days, when both the journeymen and the builders and contractors agreed to arbitration by Judge George Gessner. He granted the men an average of 50 per cent of their demands. Crafts affected were bricklayers, carpenters, plasterers, painters, sheet metal workers, hod carriers, hoisting engineers and cement finishers. Five thousand men were affected.

About 85 per cent of the employees at the plant of the Dover Boiler Works, Dover, N. J., have returned to the works, following the recent strike.

Work has been curtailed at the plant of the Merchant Shipbuilding Corporation, Harriman, Pa., owing to the strike of about 6000 employees at the yard. The controversy is one of labor grievance, covering the settlement of a recent dispute.

Due to the strike of molders at Syracuse, N. Y., practically all of the malleable and gray iron foundries in the city have been closed down, with the exception of the casting department at the plant of the Crouse-Hinds Co., which has maintained production. About 700 men have been out, with demand for increase in wages from \$5.50 to \$5.75 per day, with 8 instead of 9-hr. working day.

# Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Nov. 1, 1918, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 24.5c.; Boston, 30c.; Buffalo, 17c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 36,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, \$1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is \$1.315, minimum carload 40,000 lb.; and \$1.25, minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload 46,000 lb.; to Omaha, 50c., minimum carload 46,000 lb.; to St. Paul and Minneapolis, 49.5c.; minimum carload 46,000 lb.; Denver, 99c.; minimum carload 46,000 lb. A 3 per cent transportation tax applies. On iron and steel items not noted above, rates vary somewhat and are given in detail in the regular railroad tariffs:

## Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in. angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zeels, structural sizes, 2.45c.

## Wire Products

Wire nails, \$3.25 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of \$1.50, and shorter than 1 in., \$2.00. Bright basic wire, \$3.15 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3.00; galvanized wire, \$3.70; galvanized barbed wire and fence staples, \$4.10; painted barbed wire, \$3.40; polished fence staples, \$3.40; cement-coated nails, \$2.85 base; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60½ per cent off list for carload lots, 59½ per cent for 1000-rod lots, and 58½ per cent off for small lots, f.o.b. Pittsburgh.

## Bolts, Nuts and Rivets

Large structural and ship rivets, \$3.70 base  
Large boiler rivets, \$3.80 base  
¼ in., 5/16 in. and 7/16 in. diam., 65-10 and 5 per cent off list  
Machine bolts, h.p. nuts, ¾ in. x 4 in.:  
Smaller and shorter, rolled threads, 60-10-5 per cent off list  
Cut threads, 60-5 per cent off list  
Larger and longer sizes, 50-10 per cent off list  
Machine bolts, c.p.c. and t. nuts, ¾ in. x 4 in.:  
Smaller and shorter, 45-10-10 per cent off list  
Larger and longer, 40-10-5 per cent off list  
Carriage bolts, ¾ x 6 in.:  
Smaller and shorter, rolled threads, 60-5 per cent off list  
Cut threads, 50-10-5 per cent off list  
Larger and longer sizes, 45-10 per cent off list  
Lag bolts, 65-5 per cent off list  
Hot bolts, Nos. 1, 2, 3, 60 per cent off list  
Hot pressed nuts, sq. blank, 3.25c. per lb. off list  
Hot pressed nuts, hex., blank, 3.25c. per lb. off list  
Hot pressed nuts, sq. tapped, 3c. per lb. off list  
Hot pressed nuts, hex., tapped, 3c. per lb. off list  
C.p.c. and t. sq. and hex. nuts, blank, 3.25c. per lb. off list  
C.p.c. and t. sq. and hex. nuts, tapped, 3c. per lb. off list  
S. and finished hex. nuts:  
¾ in. and larger, 70-10 per cent off list  
9/16 in. and smaller, 80 per cent off list  
Stove bolts, in packages, 75-10-10-5 per cent off list  
Stove bolts, in bulk, 2½ per cent extra  
Tire bolts, 60-10-10-5 per cent off list  
The above discounts are from March 28, 1919.  
All prices carry standard extras. Pittsburgh basis.

## Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$52; chain rods, \$60; screw, rivet and bolt rods and other rods of that character, \$60. Prices on high carbon rods are irregular. They range from \$65 to \$75, depending on carbons.

## Railroad Spikes and Track Bolts

Railroad spikes 9/16 in. x 4½ in. and heavier, and small spikes, per 100 lb., \$3.35 in lots of 200 kegs of 200 lb. each or more; track bolts, \$4.35 per 100 lb. in carload lots of 200 kegs or more, and \$4.90 in small lots. Boat and barge spikes, \$3.85 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh.

## Terne Plate

Prices of terne plate are as follows: 8-lb. coating, 200 lb., \$13.80 per package; 8-lb. coating, I. C., \$14.10; 12-lb. coating, I. C., \$15.80; 15-lb. coating, I. C., \$16.80; 20-lb. coating, I. C., \$18.05; 25-lb. coating, I. C., \$19.30; 30-lb. coating, I. C., \$20.30; 35-lb. coating, I. C., \$21.30; 40-lb. coating, I. C., \$22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

## Iron and Steel Bars

Steel bars at 2.35c. from mill. Prices on bar iron are 2.35c.

## Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card.

Butt Weld				Iron			
Steel		Galv.		Inches		Black	
Inches							
1½, ¾ and ¾	50½	24		1½ and ¾	29½	21½	
1½	54½	40		¾	30½	3½	
¾ to 3	57½	44		¾ to 1½	34½	16½	
					39	23½	
Lap Weld							
1½	50½	38		1½	24½	9½	
1½ to 6	53½	41		1½	31½	17½	
7 to 12	50½	37		2	32½	18½	
13 and 14	41			2½ to 6	34½	21½	
15	38½			7 to 12	31½	18½	
Butt Weld, extra strong, plain ends							
1½, ¾ and ¾	46½	29		1½, ¾ and ¾	28½	11½	
1½	51½	39		¾	30½	20½	
¾ to 1½	51½	43		¾ to 1½	39½	24½	
¾ to 3	56½	44					
Lap Weld, extra strong, plain ends							
2	48½	37		1½	25½	10½	
2½ to 4	51½	40		1½	31½	17½	
4½ to 6	50½	39		2	33½	20½	
7 to 8	46½	33		2½ to 4	35½	23½	
9 to 12	41½	28		4½ to 6	34½	22½	
				7 to 8	26½	14½	
				9 to 12	21½	9½	

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

## Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel	Charcoal Iron
3½ to 4½ in. .... 40½	3½ to 4½ in. .... -16
2½ to 3½ in. .... 30½	3 to 3½ in. .... -1½
2½ in. .... 24	2½ to 2¾ in. .... +1
1¾ to 2 in. .... 19½	2 to 2½ in. .... +10
	1¾ to 1½ in. .... +20

## Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton	Per Net Ton
1 in. .... \$327	1½ in. .... \$207
1¼ in. .... 267	2 to 2½ in. .... 177
1¾ in. .... 257	2½ to 3¾ in. .... 167
1½ in. .... 207	4 in. .... 187
	4½ to 5 in. .... 207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiation.

## Sheets

Makers' price for mill shipments on sheets of United States standard gage in carload and larger lots are as follows:

Blue Annealed—Bessemer		Cents per lb.
No. 8 and heavier		3.50
Nos. 9 and 10 (base)		3.55
Nos. 11 and 12		3.60
Nos. 13 and 14		3.65
Nos. 15 and 16		3.75
Box Annealed, One Pass Cold Rolled—Bessemer		
Nos. 17 to 21		4.15
Nos. 22 to 24		4.20
Nos. 25 and 26		4.25
No. 27		4.30
No. 28 (base)		4.35
No. 29		4.45
No. 30		4.55
Galvanized, Black Sheet Gage—Bessemer		
Nos. 10 and 11		4.70
Nos. 12 and 14		4.80
Nos. 15 and 16		4.95
Nos. 17 to 21		5.10
Nos. 22 to 24		5.25
Nos. 25 and 26		5.40
No. 27		5.55
No. 28 (base)		5.70
No. 29		5.95
No. 30		6.20
Tin-Mill Black Plate—Bessemer		
Nos. 15 and 16		4.15
Nos. 17 to 21		4.20
Nos. 22 to 24		4.25
Nos. 25 to 27		4.30
No. 28 (base)		4.35
No. 29		4.40
No. 30		4.40
Nos. 30½ and 31		4.45

## Non-Ferrous Metals

### The Week's Prices

Cents Per Pound for Early Delivery.

	Copper,		Tin,	Lead		Spelter	
	New York	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
May 21	16.75	16.50	72.50	5.30	5.00	6.65	6.30
22	16.75	16.50	72.50	5.30	5.00	6.65	6.30
23	16.75	16.50	72.50	5.25	5.00	6.60	6.25
24	16.75	16.50	72.50	5.25	5.00	6.60	6.25
25	16.75	16.50	72.50	5.25	5.00	6.60	6.25
26	16.75	16.50	72.50	5.25	5.00	6.60	6.25
27	16.75	16.50	72.50	5.25	5.00	6.60	6.25

NEW YORK, May 27.

The pronounced activity evident in most of the markets up to a week ago has given place to moderate demand but prices generally are firm. Demand for copper has fallen off but quotations are unchanged. Buying of tin for future shipment has subsided and the market is otherwise stagnant. Demand for lead is again light but prices are steady. The spelter market has not improved. Antimony is considerably stronger.

### New York

**Copper.**—The recent buying movement in copper is entirely analogous to that which took place late in March and early in April. Consumers generally covered their needs at that time well into May and on this movement have apparently filled their requirements well into July and possibly through that month. There has been some buying for August delivery, but producers as a rule are disinclined to sell for that position any more than is necessary. In the last few days demand has fallen off as compared with the pronounced activity a week ago, and the market is at present quiet but firm. For June delivery electrolytic copper is quoted at 16.50c., although some producers are asking as high as 16.75c. For August delivery not less than 17c. is regarded with any favor. Lake copper for early delivery ranges from 16.75c. to 17c. The recent domestic buying is stated to have been pretty well distributed among various consuming interests. While sales for export are still of small proportions, they are reported as larger than in some weeks but at the best insignificant.

**Tin.**—The event of the past week has been the publication by the War Trade Board of the status of the tin industry up to the present time. It appears that the amount of tin in the hands of consumers, jobbers, dealers and smelters in the shape of the metal, ores and concentrates was about 22,000 tons on May 1. The amount of allocated tin in the hands of the United States Steel Products Co. on May 23 was 2199 tons out of a total of 10,169 tons originally apportioned to the United States. The average monthly consumption of tin for the first four months of this year was only 3713 tons per month. The effect of these figures upon the tin trade has been one of discouragement, to say the least. It can easily be figured from these data that even if consumption should increase to 4000 tons per month, it would take five months to consume the supply of tin already in sight in this country. If this is the case there is little prospect of an active tin market in the immediate future. Various reports continue to circulate, one to the effect that restrictions on the shipments of Straits tin have already been lifted and another to the effect that restrictions on shipments from the East will be removed first, from England second and from Canada last. Both of these reports are unconfirmed. The latter part of last week the fall in the price of tin in London caused buyers to hold back from placing orders for shipment after restrictions are removed, although some business was done. It was, however, not equal to that reported a week ago. Transactions which were put through were on a basis of about 51c. for shipments from the Straits.

Banca tin is reported to have been offered at a fraction over 50c. per lb.

**Lead.**—After the good business of the last week or 10 days, approaching almost booming magnitude, the market has turned quiet. A slight premium was obtainable on May 21 and 22 in the outside market, but this has disappeared and quotations have reached the same level as that of the leading interest, or 5.25c., New York, and 5c., St. Louis. There are quite a few sellers open for business at these levels but they admit that the demand is light.

**Spelter.**—Demand has not improved and the market is apparently marking time, waiting for developments in steel in particular and in the general situation. Prime Western for early delivery is quoted nominally at 6.25c., St. Louis, or 6.60c., New York, and it is possible that as low as 6.22c., St. Louis, could be done, but there has been no real test of values. The recent advance from around 6c. is attributed largely to selling for export, considerable of which is credited to Japan. Producers as a rule are asking premiums for delivery beyond June, or about 6.30c., St. Louis, for July and 6.35c., St. Louis, for August.

**Antimony.**—The market is in strong hands and wholesale lots for early delivery are quoted at 8.25c. to 8.37½c., duty paid, for Asiatic grades. The fluctuation in rates of exchange have had some effect on prices.

**Aluminum.**—Wholesale lots for early delivery for No. 1 virgin metal, 98 to 99 per cent pure, are quoted at 32c. to 33c., New York.

**Old Metals.**—Prices are higher in sympathy with the new metal market. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	16.50
Copper, heavy and wire	15.00
Copper, light and bottoms	13.25
Brass, heavy	11.50
Brass, light	8.50
Heavy machine composition	15.50
No. 1 yellow rod brass turnings	8.75
No. 1 red brass or composition turnings	13.00
Lead, heavy	4.75
Lead, tea	4.00
Zinc	5.00

### St. Louis

ST. LOUIS, May 26.—The non-ferrous markets have been stronger, with lead quoted, car lots, at 5c., and spelter at 6.30c. In less than car lots the prices have been: Lead, 5.25c. to 5.50c.; spelter, 6.50c. to 6.75c.; tin, 72.50c.; copper, 16 to 17c.; Asiatic antimony, 8.50c. In the Joplin district the stronger feeling in metals has been reflected in firmer prices for ore, with an advance of perhaps \$1 per ton on basic grades. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 7c.; heavy yellow brass, 9c.; light copper, 11c.; heavy copper and copper wire, 13.50c.; zinc, 3.50c.; lead, 4c.; tea lead, 3c.; pewter, 35c.; tinfoil, 44c.

### Chicago

CHICAGO, May 27.—A few large sales made the aggregate business in copper better than in any previous week this year. Buying, however, was not as general as in the previous week. Lead is a little stronger and has advanced a few points. There has been no change in tin. Spelter has been fairly active and, while there has been no change in price, there has been some buying at a premium for July and August delivery. Antimony is relatively the most active, but offerings have been light, as stocks are being closely held. Antimony has advanced a quarter of a cent. There have been no changes in old metal prices. We quote copper at 17c. for carloads; tin, 72.50c.; lead, 5.05c. to 5.10c.; spelter, 6.30c. to 6.40c.; antimony, 8.50c. to 9c. On old metals we quote copper wire, crucible shapes, 13.50c.; copper clips, 13c.; copper bottoms, 11.50c.; red brass, 13.50c.; yellow brass, 8.50c.; lead pipe, 4c.; zinc, 4c.; pewter, No. 1, 35c.; tinfoil, 37c., and block tin, 50c., all these being buying prices for less than carload lots.

## PERSONAL

Jay L. Hench, assistant district sales manager Lackawanna Steel Co., with headquarters at Chicago,



JAY L. HENCH

has been promoted to district sales manager to succeed A. P. Van Schaick, resigned to become associated with the American Chain Co., Inc. Mr. Hench's entire business career has been in the iron and steel field. For the past eight years he has been connected with the Lackawanna Steel Co. at Chicago, and during the five years previous was with Joseph T. Ryerson & Son, a greater part of the time as sales representative in Michigan and Indiana. Mr. Hench's education and training were such as to give him a thorough foundation for the vocation he entered. After graduating from high school he attended Cornell University, where he specialized in iron and steel metallurgy. In 1905 he entered the employ of the Illinois Steel Co., and for a year was engaged in practical work in the open-hearth and Bessemer departments at South Works.

Veryl Preston, New York, who has headed the Eastern Steel Co., Pottsville, Pa., for the past 15 years, has resigned as president of the company and his resignation has been accepted by the board of directors. His successor has not yet been elected. Mr. Preston plans to devote his time to his personal affairs and his holdings in the Eastern Steel Co. remain as heretofore.

J. W. Spensley, for the past five years associated with J. N. Kinney, 30 Church Street, New York, has been appointed New York sales engineer of the Champion Engineering Co., Kenton, Ohio, manufacturer of standard bridge cranes, and has opened an office in room 324 at 30 Church Street.

Dr. John A. Mathews, president Halcombe Steel Co., Syracuse, N. Y., sails for Europe this week as a member of the War Department's Aircraft Standardization Committee, headed by Assistant Secretary Crowell, which will study the standardization in aircraft building in Europe.

Charles Hubbard & Co., 81 Fulton Street, New York, announces that W. H. Peterson has been taken into the firm as an active partner with Lyman J. Fisher. They will continue to represent the Reading Iron Co. forge department, Reading, Pa., in the sale of iron and steel forgings, and the Sterling Steel Foundry Co., Braddock, Pa., in the sale of acid open-hearth steel castings.

Capt. A. H. Jessup, who has been in France in the sanitary corps, Second Army headquarters, returned with the 77th Division, and has resumed his duties as plant engineer with the Lakeside Forge Co., Erie, Pa.

The Cleveland Milling Machine Co., Cleveland, announces the appointment of H. I. Miner as sales manager.

A. C. Cook, sales manager Warner & Swasey Co., Cleveland, returned home last week from a four months' trip abroad, during which he visited England, France and Holland.

Albert J. Tanck has been appointed Wisconsin agent of the National Steel Co., Chicago.

Harry I. Irwin, foreign representative Kearney & Trecker Co., Milwaukee, manufacturer of milling machines, started recently for a trip of 18 months to two years' duration in the Orient. Mr. Irwin reached Milwaukee last week, after being absent more than four years. He was in Germany when war was declared in 1914, remaining in that country until the United States entered the contest, when he went to England. Mr. Irwin, on his present trip, intends to visit India, Japan, Australia, Java, the Malay States and Singapore.

F. H. Brown, formerly sales manager Sherritt & Stoer Co., Philadelphia, prior to that holding the same position with the Davis Machine Tool Co. of Rochester, has been elected president and general manager, and O. R. Adams, secretary and treasurer of the O. R. Adams Mfg. Co., Rochester, N. Y., lathe manufacturer, which has just increased its capital from \$30,000 to \$150,000, and let a contract for a new building.

Oscar X. Buehler, purchasing agent Midwest Engine Co., Indianapolis, has resigned to become treasurer of the Indianapolis Tool & Mfg. Co.

Charles Delos Rice has been appointed a member of the State Board of Education of Connecticut. Mr. Rice is factory manager of the Underwood Typewriter Co., Hartford.

E. A. MacDonnell has resigned as assistant secretary of the Savage Arms Corporation, Sharon, Pa., to become secretary and treasurer of the recently organized Standard Tank Car Co., Sharon, Pa.

The Carbon Steel Co., Pittsburgh, announces the return from aviation service in Italy of Harry S. Finkenstaedt, Western sales agent.

Walter White, for the last six years general superintendent Badger Brass Mfg. Co., and C. M. Hall Lamp Co., Kenosha, Wis., has resigned, effective May 15.



FRANK A. SCOTT

Frank A. Scott, vice-president Warner & Swasey Co., Cleveland, has been awarded the Distinguished Service Medal by the War Department. Mr. Scott was called to Washington in March, 1917, to become a member of the General Munitions Board, and was made chairman of the War Industries Board when that board replaced the Munitions Board. At the head of this board he was confronted with the tremendous task of bringing about a co-ordination of the industries of the country to meet the demands of the War and Navy Departments for supplies. He resigned as member of the board in August, 1917, because of ill health.

F. W. Marshner has been appointed manager of the Detroit branch of the New Departure Mfg. Co., Bristol, Conn., succeeding the late Samuel B. Dusenberre. Mr. Marshner has been with the company at its Detroit office for about seven years.

William C. Wright has been released from active duty as captain in the Ordnance Department and has resumed his association with the Read-Rittenhouse Co., iron and steel, Commercial Trust Building, Philadelphia.

C. Raymond Messinger, vice-president and general manager Chain Belt Co., and Sivyer Steel Casting Co., Milwaukee, Wis., who returned home May 24 from a three months' tour of Great Britain and the continent, says the financial situation and import restrictions imposed by European nations does not present an immediately encouraging condition to American manufacturers, although he looks to see an exporting movement possible probably within three or four months.

Owen W. Streett, Bethlehem, Pa., has been appointed assistant to purchasing agent, Bethlehem Shipbuilding Corporation, Ltd., Union Plant, San Francisco, Cal. Mr. Streett has been a buyer of mechanical and electrical equipment at the central purchasing office, Bethlehem Corporations, for the past two years, and was previous-

ly attached to the office of the chief engineer at Steelton, Pa.

Col. Douglas I. McKay has been elected president of the Pulverized Fuel Equipment Corporation, 30 Church Street, New York, to succeed John E. Muhlfeld, who retires to return to consulting engineering practice.



COL. DOUGLAS I. M'KAY

Since July, 1917, Colonel McKay has been engaged in war work, first being commissioned major in the Ordnance Reserve Corps, in charge of the raw materials branch of the Gun Division, where he purchased all raw and semi-finished materials. In January, 1918, he was promoted to lieutenant-colonel of the National Army and appointed assistant director of purchase and supply. He had supervision over the purchasing operations of the several supply corps of the War Department, including Ordnance Department, Quartermaster Corps, Medical Corps, Corps of Engineers and Signal Corps. He was subse-

quently promoted to colonel. He was graduated from West Point, and spent three years in the army, resigning to become deputy chief of the aqueduct police. Later he was appointed police commissioner of New York. Then he became assistant to the president of J. G. White & Co., Inc., and two years later was elected vice-president and director. Colonel McKay is also vice-president and director of the Chemical Foundation, Inc., director of the International Agricultural Corporation and director of the Botany Worsted Mills.

John E. Muhlfeld has formed the Railway and Industrial Engineers, Inc., 25 Broad Street, New York, to act as consulting and advisory engineers between the bankers, Railroad and industrial corporations. Mr. Muhlfeld for the past five years has been specializing in the development of the "Lopulco" system for burning pulverized fuel in locomotives, stationary boilers and metallurgical and chemical furnaces, and for the past three and one-half years has been president of the Pulverized Fuel Equipment Corporation and the International Pulverized Fuel Corporation. He remains a director of the former corporation.

George Ostendorf, formerly with the Tropical Paint & Oil Co., Cleveland, has become associated with the sales organization of the Hilo Varnish Corporation, Brooklyn, N. Y. Mr. Ostendorf will make his headquarters at Cleveland and will look after both the manufacturing and the jobbing trade in northern Ohio.

Theodore Geissmann & Co., 332 South Michigan Boulevard, Chicago, have been appointed sales agents in the Chicago district for the Donner Steel Co., Buffalo.

William K. Stamets, dealer in machinery tools, Jenkins Arcade, Pittsburgh, has opened an office in the Hickox Building, Cleveland, in charge of William S. Dickson, formerly general manager of the Greaves-Klusman Tool Co., Cincinnati.

Prof. William H. Dosey, head instructor of foundry practice at Carnegie Institute of Technology, Pittsburgh, has been appointed assistant in the training method section of the United States training service. This service is under the Department of Labor. Mr. Dosey is a native of Sheboygan, Wis.

De Courcy Browne, formerly with the Metal & Thermit Corporation, New York, was recently promoted from captain to major in the A. E. F. Major Browne is at present connected with the American Courier Service, 4 Place de la Concorde, Paris, but contemplates remaining in Europe provided he secures the European

representation of an American company in steel or metal lines.

The Youngstown office of the U. S. Ordnance Department has closed permanently and its business will be taken care of hereafter at the office of Second Lieut. Robert J. Phillips, Plymouth Building, Cleveland. Presly E. Taylor and John W. Johnson, who were connected with the Youngstown office, have been transferred to the Cleveland office.

Lieut.-Col. Thomas F. Brown has secured his release from the army and has taken an interest with Butler & Hayes, Inc., industrial engineering, Boston, becoming vice-president and general manager of that firm. Colonel Brown was commissioned major in the Ordnance Department and called to service in June, 1917. After varied service in the United States, France and England, he was sent to the Boston district ordnance office as contracting officer and member of the district claims board. He had been metallurgist at Watertown Arsenal, and in 1912 the Government sent him abroad to investigate methods of steel and foundry practice with particular reference to the Hatfield method of manufacturing armor-piercing projectiles and other processes connected with the production of shell forgings. Later he was superintendent of the Framingham Foundry Machine Co., which was manufacturing English and Russian projectiles and also other foundry products.

George W. Shartle, of the Shartle Machine Co., Columbus, Ohio, was mustered out of army service May 5. He commanded Company F, 112 Supply Train, on the entire western front and was in charge of maintenance of the trucks of the Thirty-seventh Division. In addition to operating the Shartle Machine Co. he will handle second-hand iron and wood-working machinery and power equipment and will represent the Gem City Boiler Co., Dayton, Ohio, in eastern Ohio, West Virginia and western Pennsylvania.

W. T. Walker, formerly of the Walker-Weiss Axle Co., Flint, Mich., has been elected president and general manager of the M. & S. Corporation, whose business was recently moved from Detroit to Cleveland. L. O. Haskins, formerly with the O. & S. Bearing Co., Detroit, has been appointed director of sales and advertising.

The American Graphite Co., Ticonderoga, N. Y., a subsidiary of the Joseph Dixon Crucible Co., Jersey City, has created a new office, that of assistant secretary and assistant treasurer, and has elected William Koester to fill it. At the recent annual meeting all directors and officers of both companies were re-elected.

Dr. Arthur A. Hammerschlag, director of Carnegie Institute of Technology, Pittsburgh, recently received the bronze medal awarded him by the Panama-Pacific International Exposition. He was a member of the international jury of awards at the exposition.

W. A. Booth, until recently secretary of the Manufacturers' Association of Pontiac, Mich., has resigned to take charge of the employment department of the Wilson Foundry & Machine Co., that city.

Among the passengers on the steamship Rochambeau, which sailed from New York on Tuesday, May 27, for France, were E. H. Haslam, Mackintosh-Hemp-hill Co., Pittsburgh; David Eynon, president Pittsburgh Rolls Corporation, Pittsburgh; W. T. Hurst, Pittsburgh Coal Washer Co., Pittsburgh; F. J. Schwarz, General Electric Co., and H. M. Austin, Belgo-American Corporation, 1418 Walnut Street, Philadelphia, who will assist in reconstruction work in France and Belgium.

A. H. Bauman, formerly general foreman of the 155-mm. gun shop of the American Brake Shoe & Foundry Co., Erie, Pa., has become associated with the sales department of the Cleveland Duplex Machinery Co., Cleveland, dealer in new and used machinery.

Channing R. Dooley, formerly manager educational department Westinghouse Electric & Mfg. Co., and president of the Casino Technical night school at East

Pittsburgh, has resigned to take charge of vocational work of the Standard Oil Co., New York. Mr. Dooley was tendered a farewell dinner by his former associates at which E. M. Herr, president Westinghouse Electric & Mfg. Co., made an address.

Major Kingsley G. Martin, formerly advertising manager of American Steel Export Co., New York, who entered the service as captain in the motor transport corps, has been promoted to lieutenant-colonel in command of base section No. 1 located at St. Nazaire, France.

James A. Buell, general superintendent United Alloy Steel Corporation, Canton, Ohio, has been promoted to assistant general manager, being succeeded by Harry C. Thomas, who has been assistant general superintendent. J. B. Thorpe takes Mr. Thomas' former position.

## OBITUARY

AMBROSE M. ROBBINS of Cleveland, for many years associated with M. A. Hanna & Co. as manager of the Claire furnace, Sharpsville, Pa., died May 26, aged 82 years. He built the Sharpsville furnace in 1869 and remained in charge of it until he retired 15 years ago. Previously he was associated with the Falcon Iron Co., Niles, Ohio, and with a Newcastle, Pa., mill.

MATTHEW GRISWOLD, SR., manufacturer, Erie, Pa., died May 19, aged 86 years. He was founder of the Selden-Griswold Mfg. Co., Erie, in 1865, this company later becoming the Griswold Mfg. Co. He was active in politics and represented the Erie district in Congress in 1890 and in 1894.

JOSEPH DOUGLAS GALLAGHER, vice-president, general counsel and director of the American Brake Shoe & Foundry Co., died in New York May 20 following an operation at the age of 65. His breakdown in health was attributed to his overwork when in charge of the munitions and ordnance manufacture of the company.

LIEUT. HARRY B. GUY, former purchasing agent for the Carnegie Steel Co., died suddenly in Canton, Ohio, May 21. During the war Lieutenant Guy served in the ordnance department of the army. He was 34 years old.

EDWIN E. JACKSON, JR., lawyer and organizer some years ago of wire pools and business combinations, died May 26 at his home in Brooklyn, N. Y., aged 52.

CHARLES A. SINCLAIR, for eight years assistant secretary and treasurer of the Anderson Forge & Machine Co., Detroit, died suddenly of pneumonia May 22.

JOHN LLEWELLYN, vice-president Llewellyn Iron Works, Los Angeles, Cal., died in New York April 23.

### Better Demand at Youngstown

YOUNGSTOWN, OHIO, May 26.—Iron and steel business in the Youngstown district shows a decidedly better tone, both on account of the volume of inquiries received and the actual orders placed. The improvement covers practically all lines of finished material, while some semi-finished products are in stronger demand than at any time since the armistice signing. One Valley maker has received an order for 6,000 tons of open-hearth sheet bars, to be delivered during the third quarter. This is but the beginning of other orders from this same consumer, it is stated, who bought at this time in anticipation of a possible rise in the price of sheet bars.

The sheet trade is also showing sporadic signs of betterment, although mills are still operating on an average of 65 per cent of normal. A district maker has received an order for blue annealed that will keep his plant operating for six weeks. Most orders, however, are for small lots and immediate delivery.

An export order for 6,000 tons of skelp was recently placed here. Demand for both lapweld and butt-weld pipe continues as usual, with the mills running at 65 per cent. Wire mills are running fairly heavy to meet the demand for wire and nails, which are being absorbed in large quantities by the building trades.

### Youngstown Pressed Steel Co. Will Build New Plant

YOUNGSTOWN, OHIO, May 27.—President W. W. Galbreath of the Youngstown Pressed Steel Co., today issued the following statement concerning the corporation's plans for a new plant at Warren, Trumbull county:

"The Youngstown Pressed Steel Co., now operating factories in East Youngstown, Haselton and Sharon, has acquired a tract of land of approximately 40 acres in Warren, at the intersection of the Pennsylvania and Erie tracks, and will build a new plant there at once. It will consolidate, in the new plant, the three factories which they are now operating.

"This company was formed shortly after the Sharon Steel Hoop Co. bought out the Youngstown Iron & Steel Co., the new company purchasing from the Sharon Steel Hoop Co. the pressed steel and fire-proofing departments previously operated by the Youngstown Iron & Steel Co., and the channel and corner bead department of the Sharon Steel Hoop Co. The past year and a half have marked a real growth and development of the new organization. The new plant, which will provide ample room for operating the machines now owned by the company, will be nearly four times as large as the combined area of the present factory.

"The plant will occupy 291,200 square feet of floor space, and with equipment will cost considerably over \$1,000,000. At the present time the company has arranged with the Warren Building Co. to erect houses for the employees which will be sold through the company on easy terms. Between 500 and 600 men will be required to operate the plant to full capacity. The officers state that it is the intention to add new lines of steel products as rapidly as possible and the present buildings have been designed to allow addition in the immediate future of several new products which the company is developing at the present time.

"At the present time the products include all types of pressed steel parts for automobiles, trucks, implement tractors and any special requirements where castings and forgings have been previously used. The fire-proofing products consist of metal lath, expanded metal, cold formed channels, corner bead, studding, etc.

"The erection of the new plant will commence at once and the machinery will be transferred as rapidly as the different buildings are completed."

The space to be vacated at the Haselton works of the Sharon Steel Hoop Co. will be utilized in erecting four additional hot mills, which will give the company 15 in all; the warehouse will be moved to the eastern end of the mill yard and a large and modernly equipped machine shop built.

Officers of the Youngstown Pressed Steel Car Co. are W. W. Galbreath, president; W. G. Kranz, Cleveland, vice-president; A. J. Watson, Youngstown, treasurer. Directors are, besides the officers, Severn P. Ker, George W. Short and J. Reid Evans, Sharon, Pa., and C. A. Manchester, Youngstown.

### Takes Over Sheet and Tin Plate Company

The general management of the Hudson Sheet & Tin Plate Co., Marietta, Ohio, has been taken over by Otis & Co., brokers, Cleveland, and George W. York and J. H. MacLeod, of the latter firm, have been elected president and secretary and treasurer respectively. The general sales office will be located at 712 Hickox Building, Cleveland, and will be in charge of Lawrence Hamill and Wilson B. Hickox. The plant is owned by a company in Denmark, and its erection was started early in the war, when the scarcity of tin plate led the Danish interest to arrange to build a plant to supply its own requirements of tinplate. The plant has six tin mills with a capacity of 400,000 base boxes per year. It will be placed in operation shortly.

The A. M. Byers Co., Inc., Pittsburgh, manufacturer of wrought iron pipe, will erect a water treating and filter plant 72 x 32 ft. at its Southside mills in that city to cost about \$35,000.

## IRON AND STEEL JOBBERS

### Trade Discussions at the Tenth Annual Convention at St. Louis

With about 200 members and others in attendance, the tenth annual convention of the American Iron, Steel and Heavy Hardware Association was held at the Jefferson Hotel, St. Louis, May 20 to 22. The association has an active membership of 180 jobbers of iron and steel and heavy hardware products, and in its associate membership are about 125 manufacturers of the products handled by the members. It is the custom at the annual convention to discuss trade questions in executive session, alternating with which are open sessions at which matters of more or less public interest are considered.

The St. Louis convention was well attended and keen interest was shown by the attendants in the informal exchange of views on business conditions, all apart from the proceedings in the convention hall. In fact, one of the chief values of such meetings lies in what is said in hotel lobbies and in committee rooms and in all the social minglings which these occasions make possible.

There was general testimony to an improved feeling in all distributing centers, particularly noticeable in the preceding ten days. Naturally the question of prices came in for attention, and notwithstanding the attitude of Government authorities at Washington, there were jobbers present who look for an advance in the market later in the year. While it was conceded that some irregularity has appeared in mill prices in a few lines, there was general comment on the firmness with which leading manufacturers had held to the schedule announced at Washington, March 21. It was agreed that the abandonment of the Government's stabilization project had not had any unfavorable effect on the market, so far as prices are concerned, and in respect to demand had apparently paved the way for better things.

The entertainment which had been arranged for by St. Louis manufacturers and jobbers was on a generous scale. There was a reception with dancing on Tuesday evening, May 20. An informal dinner and cabaret entertainment were given at the Missouri Athletic Club, Wednesday evening, and Friday was devoted to a golf tournament. For the ladies there were drives, luncheons and a theater party.

The sessions were presided over by F. H. Butts of the Butts & Ordway Co., Boston, who gave the president's address, in which the trade developments of the war and of the past six months were reviewed. The discussions in the executive session of Tuesday afternoon were on the "Course of the Market and Developments in Warehousing," "Warehouse Extras and Quantity Differentials," "Cutting Charges and Waste in Warehousing" and "Freight from Warehouse." These discussions followed the report of the iron and steel committee presented by Chairman E. J. McCarthy, of Beals, McCarthy & Rogers, Buffalo.

The addresses of the open session of Wednesday morning were by Samuel O. Dunn, Chicago, editor of the *Railway Age*, on "Railroad Ownership and Operation in the United States," and by A. I. Findley, editor of *THE IRON AGE*, on "Tendencies and Developments in the Iron and Steel Trade." Mr. Dunn ably discussed the plans which have been proposed for the handling of the railroads after the relinquishment of Government control, his exposition of these being largely in response to questions asked by his auditors. His address was an argument against federal operation of railroads, in view of the disastrous experience under Government control in the past year. He predicted an advance in freight rates of at least 15 per cent whether the railroads continued to be operated by the Government or are returned to their owners. "Unsatisfactory as the results of Government operation have been thus far," he said, "some of the worst influences which would prevail under permanent Government operation have not made themselves felt." In

referring to the deficits which must be made up by taxation, he said that it would be cheaper for the public to permit an advance in railroad rates and the return of the roads to private control than to have Government control continue without any rate advance.

Wednesday afternoon was given up largely to the report of the bolt and nut committee presented by W. J. Dean of Nicols, Dean & Gregg, St. Paul, also to discussions on "Relations of Bolt Manufacturers and Distributors" and "Selling Bolts f.o.b. Pittsburgh." Representatives of the bolt manufacturers took part. In connection with the discussion on a Pittsburgh basing for bolts and nuts there came up the proposal for an equalization of freights, as against the practice of selling f.o.b. point of delivery.

The matter of extras, on which practice has differed in different sections had attention, as at previous conventions. In the war period, while the trade was to a large extent under regulation by the American Iron and Steel Institute committee, there was an effort to secure adhesion to the mill practice of half extras. However, in some districts three-quarter extras were charged and in others full extras. The sentiment among the jobbing trade is for uniformity in warehouse extras.

A feature of the Tuesday session was a tribute paid by R. W. Donigan, Louisville, Ky., to Capt. Ed Buford, Jr., of Nashville, Tenn., who recently returned from France with recognition both from the United States and the French Governments of his distinguished service in aviation. Captain Buford is the son of Colonel Ed. Buford, a veteran member of the association, the head of Buford Brothers, Nashville, and when Captain Donigan told of the son's exploits in France the entire audience rose as a mark of respect to the father.

The election of officers held on Thursday resulted in the choice of S. L. Orr, Orr Iron Co., Evansville, Ind., heretofore chairman of the executive committee, as president for the coming year. Other officers elected were the following: First vice-president, E. J. McCarthy, Buffalo, N. Y.; second vice-president, Andrew Wheeler, Philadelphia; secretary-treasurer, A. H. Chamberlain, New York. Members of the executive committee—W. E. Bittenbender, Scranton, Pa.; W. L. Niekamp, St. Louis; J. S. Proctor, Minneapolis, Minn.; J. B. Carse, New York, and Roy Hall, Fresno, Cal. F. H. Butts, Boston, retiring president, was elected to the advisory board, the former members of which were re-elected.

### Plant Activities at Youngstown

YOUNGSTOWN, OHIO, May 26.—Mill operations are better this week "in spots" than at any time in the past month. Blast furnace schedules are on the following basis: Sharon Steel Hoop Co., one at Lowellville; Struthers Furnace Co., one; Youngstown Sheet & Tube Co., four; Republic Iron & Steel Co., three; Carnegie Steel Co., at the Ohio works, four; Brier Hill Steel Co., two.

The Sheet & Tube Co.'s operations are about 65 per cent. In the fore part of the week the sheet mill plant was down entirely, as was the plate mill. Two skelp mills are also idle and two blast furnaces at Hubbard. Other departments are running full.

One of the best showings is by the Sharon Steel Hoop Co., which started its plate mill Monday and six of nine hot mills. The entire plant would be in operation except for repairs required on the engine pulling mills Nos. 1, 2 and 3.

The open hearth department of the Republic Iron & Steel Co. is running about 55 per cent, with finishing mills proportionately. Four bar mills are idle at the Brown-Bonnell works.

Schedule for the Ohio, Upper and Lower Union and McDonald works of the Carnegie Steel Co. is better than 90 per cent. The Ohio works may resume operation of its rail mill, if orders warrant, state officials. With the exception of the bar mill and blast furnace the Girard plant of the A. M. Byers Co. is operating in full.

## EIGHT-HOUR DAY IN FRANCE

### National Agreement Between Employers and Workmen in French Metallurgical Industry

PARIS, FRANCE, May 9.—An industrial agreement was signed in Paris on April 17 by the representatives of the union of the iron, steel and engineering industries (Union des industries métallurgiques et minières, de la construction mécanique, électrique et métallurgiques et des industries qui s'y rattachent) and the representatives of the Metal Workers' Federation. This agreement is a fact of far-reaching importance for the future, both of the industry concerned and, let us hope, of social progress and industrial prosperity in France.

The Metal Workers' Federation is a national union, about 200,000 strong, created in 1890 and affiliated to our General Federation of Trade Unions (la Confédération générale de travail, or la C. G. T., for short). The employers' union, national also, is composed of such big organizations as the Ironworks' Committee (Comité des Forges) and others of less importance.

For months the claim of an 8-hr. day had been in the forefront. It was the first item in the minimum program set up by the C. G. T.; it was known that its principle had been accepted without any opposition by the commission on international labor legislation, which proposed to put it down in the Peace Treaty, and that it was also the first item in the agenda of the international conference which is to be held at Washington in October. Besides, the French Government was preparing an 8-hr.-day bill with the help of a joint committee of employers and men.

In the iron and steel industries the workmen's unions, which are, nearly all of them, affiliated to the national federation, were getting ready to put forward a claim for an 8-hr. day. On March 14 the executive committee of the federation passed a resolution stating that, as the principle of the 8-hr. day is accepted everywhere, the time had come to carry it out. A letter was sent on March 25 to the employers to ask them to appoint delegates to meet a delegation of the men's organization.

The two delegations met on April 5. At the end of the fourth sitting, April 17, an agreement was arrived at and signed, on behalf of the employers' union, by Messrs. Charles Laurent, president, de Wendel, Richemond, Cordier, Th. Laurent and Fournier.

The employers' union accept the 8-hr. day and the workmen gave the pledge "sympathetically to fit themselves to the development of machinery and to the rational methods of working, in order to cause production to regain soon an equilibrium absolutely necessary to the general welfare." The employers' delegates promised that the reduction of the working day should involve no lowering of the day's wages; and as to piece work, the rates should be revised, to allow the workmen to get their previous earnings.

The men agreed that the reduction of the working day should not take place until June 1, but on account of the particular difficulties concerning the management of continuous process works, it was decided that in these works the carrying out of the reduction would be postponed until the end of the half-year following the signing of the preliminaries of the Peace treaty.

This is not the only exception brought to the June 1 rule. Another clause, the scope of which is much more wide-reaching, provides that, until June 1 or the end of the half-year following the signing of the preliminaries of peace, the representatives of the employers and the representatives of the men will examine together the delays and stages which should be enacted for certain trades, kinds of work, etc., in order to leave time for new measures of organization, the improvement of plants and the engagement of supplementary labor.

Important are the exemptions to the rule of the 8-hr. day which are forecast. These exemptions will be either permanent, as in the case of continuous process works, in which a special organization is necessary,

or such operations as must necessarily take place before or after the general working day.

The president of the employers' union, Charles Laurent, in an interview said that the importance of the agreement could not be exaggerated, as it was a first step toward new relations between employers and men.

The declarations on both sides show a true good will and are of good omen.

The labor question in France has incurred great changes since the beginning of the war. The employers' organizations had to face alarming conditions and to deal with workmen's unions, the membership of which had increased immensely during the war. In the new order the employer would be no more the absolute monarch of the old type. The question with the French iron and steel industries will be, as it is in countries where such agreements have been in existence, not so much in the prevention of friction as in the quick and friendly settlement of any dispute which may arise.

Increased production is a necessity recognized and dealt with in every trade unionist paper and practically by every responsible trade union leader. There is at the present time a general and strong feeling in all the committees of men's unions that the intensification of production is the very condition of the shortening of the working day; and very few, if any, unionist leaders would admit to-day that, with the 8-hr. day, production must not be maintained at any costs. The officers of the Metal Workers' Federation profess very strong opinions on this point.

At a time when we look forward more eagerly than ever to the end of wars between nations, it is easy to understand that we lay hold of the hopes given to us by this agreement that social wars may also become more and more impossible.

A. GARNAULT.

### The Bethlehem Improvement Program

HARRISBURG, PA., May 26.—Additions and improvements to the Steelton, Pa., plant of the Bethlehem Steel Co. were referred to by Charles M. Schwab, while on a visit of inspection last week. What the improvements will be and when they will be made Mr. Schwab did not indicate further than to say that they will be along the line of those made to the plant since its purchase from the Pennsylvania Steel Co. President E. G. Grace announced that some railroad work had been transferred from the Bethlehem, Pa., plant, in order that the Steelton rail mills might be kept in operation during the dull period. He said further that considerable steel for export will be rolled at the Steelton plant within a short time.

Several days following the visit to the Steelton plant, announcement was made of the receipt of orders for steel rails for the Japanese Government and a liberal portion of the Bethlehem interests' share of the Government rail order. The bridge and construction department is kept running full on the completion of an order for steel for a Chicago skyscraper.

BALTIMORE, May 24.—Charles M. Schwab, chairman of the Bethlehem Steel Corporation, while on a visit of inspection to the plant at Sparrows Point, Md., announced that about \$25,000,000 will have been expended on the new construction at the works there by Jan. 1, 1920. He made the announcement at a luncheon which was given him and his associates at the Sparrows Point Club. He was accompanied by Eugene G. Grace, president, Quincy Bent and C. A. Buck, vice-presidents, and F. A. Shick, auditor. Among the improvements announced will be extensions to the sheet and tin plate capacity. It is understood that 12 mills will be built at the tin plate plant. Mr. Schwab also said that the force of workmen would be increased before Jan. 1 to about double the number now employed. The tour of inspection included a visit to the new 40-in. blooming mill, which started rolling on May 19.

The name of the Peninsular Tool Salvage Co., Detroit, has been changed to the "Tool Salvage Co.," because the word "Peninsular" was a "long and difficult word to pronounce and write."

# Machinery Markets and News of the Works

## LARGER ORDERS PLACED

### Tone of Machine-Tool Market Is Decidedly Improved

**Columbia Graphophone Co., Bridgeport, Conn., Largest Buyer of Past Week—Prospects Multiply**

There is a distinctly improved tone in machine-tool markets, and in some of the distributing centers business is quite active. May will be a decidedly better month than April in the amount of business placed. The Columbia Graphophone Co., Bridgeport, Conn., has bought several hundred thousand dollars worth of new tools for a six-story factory addition. One New England manufacturer of milling machines and grinders received orders from this source aggregating \$100,000. The Federal Shipbuilding Co., Kearny, N. J., is also an active purchaser, and its orders will make a large total. The American Shell Co., Paterson, N. J., came into the market last week for a good-sized list of equipment for peace-time activities, and its buying will probably be concluded this week. Another buyer is the New England Westinghouse Co., Springfield, Mass., which will make automobile starters and lighters.

Prospects in the East are multiplying. Business is being closed without the hesitation which marked

transactions up until within the last few weeks. The Osgood Bradley Car Co., Worcester, Mass., has issued a list of about 60 tools for manufacturing automobile parts. The Chicago Pneumatic Tool Co., Chicago, will build a new plant at Franklin, Pa., for which considerable new equipment will probably be required.

Inquiries have been received in New York for equipment for the new St. Malo shops of the Canadian National Railways at Quebec. Buying will be done at Toronto, Ont.

Export business has shown some improvement, but exporters are somewhat disturbed by reports from Washington that the War Department is negotiating to dispose of a large part of its surplus stock of machine tools, valued at \$50,000,000 to \$75,000,000, to France and Belgium for the rehabilitation of their manufacturing plants, credits to be arranged through inter-government financing.

From Milwaukee it is reported that the Takata and Mitsui companies of Japan have placed orders for about \$2,000,000 worth of mining machinery.

The Chicago trade grows more optimistic as it sees indications of buying of tools in larger lots. The Bucyrus Co., South Milwaukee, which has had a large list before the Chicago trade for two months, is expected to buy soon. The president of the Studebaker Corporation, South Bend, Ind., announces that \$8,500,000 will be spent this year for expansion of that plant.

## New York

NEW YORK, May 27.

Continued improvement in business is evident in the machine-tool trade. Actual buying and active prospects are on the increase, and hope is entertained that many projects which have been pending for some weeks or months may soon reach a definite conclusion. Purchases by the Columbia Graphophone Co., Bridgeport, Conn., have totaled several hundred thousand dollars, one company getting an order for about \$100,000 worth of grinders and milling machines. The company will erect a new six-story building at Bridgeport for the manufacture of talking-machines. The Federal Shipbuilding Co., Kearny, N. J., has come into the market as an active buyer. One of its orders was for nearly \$30,000 worth of lathes and many other tools are required. Some electrical equipment was also purchased.

The American Shell Co., Paterson, N. J., has inquired for a list of equipment, which may run into large figures, its requirements including drills, milling machines, screw machines, lathes, presses and punches and shears. The plant, which was engaged during the war in shell-making, will be utilized for the manufacture of centrifugal extractors and motors for washing machines.

Another buyer of machine-tool equipment is the New England Westinghouse Co., Springfield, Mass., which has placed orders for drills, grinders and other tools for the manufacture of electric starters and lighters.

The Osgood Bradley Car Co., Worcester, Mass., which was mentioned last week as being in the market for equipment for making automobile parts for the Standard Steel Car Co., Pittsburgh, wants the following tools:

- \* 16-in. engine lathes.
- \* 2-in. turret lathes, Warner & Swasey, Jones & Lamson or equivalent.
- \* 3-in. turret lathes, Warner & Swasey, Jones & Lamson or equivalent.
- \* 24-in. turret lathes, Warner & Swasey, Jones & Lamson or equivalent.

- 4 3½-ft. radial drills.
- 1 4-ft. radial drill.
- 9 double-spindle drills.
- 3 No. 1 Cincinnati plain milling machines or equivalent.
- 6 No. 2 Cincinnati plain milling machines or equivalent.
- 1 No. 4 Cincinnati plain milling machines or equivalent.
- 1 Bealy disk grinder.
- 1 30 x 36 Landis or Norton grinder.
- 3 6 x 32 Landis or Norton grinders.
- 1 Lapointe broaching machine.
- 1 Taft-Pierce thread miller.
- 1 30-in. planer.
- 1 10-in. speed lathe.
- 1 No. 5 Atlas arbor press.
- 1 No. 1½ Atlas arbor press.
- 1 No. 2 Norton or Brown & Sharpe cutter grinder.
- 1 No. 2½ Leblond universal miller.
- 1 16-in. Pratt & Whitney tool-room lathe.
- 1 14-in. x 8 ft. Reed-Prentice lathe.
- 1 No. 2 Brown & Sharpe surface grinder.
- 1 18-in. shaper.

Westinghouse Church Kerr & Co., New York, are taking bids on a new plant for the Chicago Pneumatic Tool Co. at Franklin, Pa., for which considerable equipment will probably be required. Brewster & Co., Long Island City, are making purchases of tools through the J. G. White Engineering Corporation, New York.

Inquiries have been received in New York for equipment for the new St. Malo shops of the Canadian National Railways at Quebec. Although little information has been received in the New York trade regarding this project it is understood that a large list of shop machinery is to be purchased. Doubtless most of the orders will be placed in Canada.

The first Belgian manufacturing company to complete purchases in this country for the rehabilitation of its plant is the Fabrique Nationale de Armes de Guerre, Liège, Belgium, whose representative, Armand Stouls, at the Van-

derbilt Hotel, New York, has given confirming orders for a large list of tools for which inquiries were made two or three months ago. The company will manufacture automobiles, motor cycles and bicycles. The Dubied Machinery Co., 350 Broadway, New York, has also concluded large purchases for its English and Swiss plants, which make knitting machinery. Verbal orders were placed some weeks ago for this equipment, and confirmation has since been given.

The crane business remains very dull, though some encouragement is detected by sellers in the attitude of prospective buyers. The Champion Engineering Co., Kenton, Ohio, has received an order from Westinghouse Church Kerr & Co., New York, for three grab bucket cranes. The Northern Engineering Co., Detroit, has obtained an order for a transfer crane from the American Cyanamid Co. The Baltimore & Ohio Railroad has inquired for a 200-ton shop crane.

The Railway & Power Equipment Co., Woolworth Building, New York, desires quotations on a list of about 60 machines for export. Either new or used tools are acceptable. The list includes automatic screw machines, drill presses, punch presses, radial drills, bending rolls, planers, milling machines, grinders, etc.

The Andes Copper Mining Co., 42 Broadway, New York, is having plans prepared by Sanderson & Porter, engineers, 52 William Street, for a new plant at its works at Parquito, Chile, to cost, with machinery and equipment, about \$1,000,000.

The Schebler Carburetor Co., 1671 Broadway, New York, manufacturer of carburetors, has been incorporated with a capital stock of \$10,000 by J. M. Wright, P. and D. Babbott, 68 William Street.

The Reliable Planopin Mfg. Co., Brooklyn, has been incorporated with a capital stock of \$30,000 by M. and L. Naham, and M. E. Thompson, 285 State Street, to manufacture piano hardware.

The Coldwell Lawn Mower Co., Newburgh, N. Y., has increased its capital stock from \$120,000 to \$195,000.

Property of the Jagenberg Machine Co., 131 West Twenty-fourth Street, New York, manufacturer of packaging machines, will be sold by Francis P. Garvan, Alien Property Custodian, on June 5.

The Hudson Automatic Sprinkler Co., New York, has been incorporated with a capital stock of \$50,000 by H. O. Pierson, B. J. Foley and M. Roob, 167 Sumner Avenue.

The New York Belting & Packing Co., 91 Chambers Street, New York, has awarded contract to the J. W. Ferguson Co., Paterson, N. J., for a five-story addition to its mechanical rubber goods manufacturing plant at Passaic, N. J., 80 x 225 ft., to cost, with equipment, about \$400,000.

The S. O. S. Welding Corporation, New York, has been incorporated with a capital stock of \$200,000 by W. A. Rosenbaum, V. D. Borst and J. E. Zelenko, 1 Park Row, to manufacture electric welding apparatus, etc.

Price & Elkin, Inc., New York, has been incorporated with a capital stock of \$20,000 by E. F. Aller, J. F. Curren and G. Meyer, 982 East 179th Street, to manufacture engineering instruments, etc.

The Glennan Improved Hub Ferrule Co., Brooklyn, has been incorporated with a capital stock of \$15,000 by J. J. Kelly, J. M. Zurn and J. J. O'Brien, 837 Herkimer Street, to manufacture ferrules and other mechanical specialties.

The Advance Rubber Co., 1717 Eighth Avenue, Brooklyn, manufacturer of automobile tires, etc., is considering the construction of a one-story brick plant, 26 x 130 ft., at Gardner and Flushing avenues, to cost \$75,000.

The Motalarm Corporation, New York, has been incorporated with a capital stock of \$75,000 by T. A. Schickling, A. R. May and T. L. Thompson, 338 Sixteenth Street, Brooklyn, to manufacture metal products for automobile service.

The F. J. Hill's Sons, Inc., New York, has been incorporated with a capital stock of \$20,000 by J. J. Gibbons, C. and C. H. Hill, 6 Howard Street, to manufacture machinery, parts, etc.

The City Works Department, New York, has had plans prepared for a one-story forge and blacksmith shop, 20 x 59 ft., on Ninety-first Street, near Avenue A. Frank H. Hines, Municipal Building, is architect.

The Eldridge-Allen Garage Corporation, New York, has leased the seven-story building at 59 Allen Street and 88 Eldridge Street for a local establishment.

The Erny Candy Machinery Co., New York, has been incorporated with a capital stock of \$10,000 by E. and C. E. and H. Erny, 75 Fulton Street, to manufacture confectionery machinery.

The Chauncey Car Construction Co., 1580 President

Street, Brooklyn, manufacturer auto parts, etc., has filed plans for a one-story brick building, 100 x 100 ft., on Chauncey Street, near Evergreen Avenue, to cost \$25,000.

The S. B. Auto Radiator Mfg. Co., New York, has been incorporated with a capital stock of \$10,000 by B. Borinsky, H. and S. Berman, 216 East 119th Street, to manufacture automobile radiators.

The Expert Machine & Tool Corporation, 91 Crosby Street, New York, has filed notice of dissolution.

Fire, May 13, in the five-story factory at 241 Lorimer Street, Brooklyn, caused a loss of about \$15,000, sustained in part by the Brust Brothers Co., nickel plating works and by the Metal Spinning Co.

The Hudson Motor Car Co., 1842 Broadway, has filed plans for a ten-story building at Amsterdam Avenue and Sixty-second Street, to cost \$550,000.

The Ever Ready Machine & Tool Works, Inc., 122 Centre Street, New York, has been dissolved.

The Gibraltar Tire & Rubber Corporation, Brooklyn, has been incorporated with a capital stock of \$1,400,000 under Delaware laws, by Richard Krause, Classon Point, N. Y.; M. A. Heyser, Brooklyn; and Arthur Watson, Nyack, N. Y., to manufacture automobile tires, etc.

Cesare Marcucci, 135 West Third Street, New York, manufacturer of tin cans, has filed plans for a two-story addition, 25 x 150 ft., to cost \$22,000.

The Snyderflba Corporation, Hackensack, N. J., has been incorporated in Delaware with a capital stock of \$100,000 by Cornelius A. Cole, Hackensack; Paul E. Britsch, Brooklyn; and Arthur R. Oakley, Pearl River, N. Y., to manufacture electrical devices.

The Olbon Auto Lock & Machine Co., Paterson, N. J., has been incorporated with a capital stock of \$25,000 by John A. Olbon, 539 Totowa Avenue; Ernest B. Ratsch and Joseph H. McCabe, to manufacture automobile locks.

The Charles Hartmann Co., 985 Dean St., Brooklyn, is planning for a two-story addition to its sheet metal manufacturing plant to cost about \$25,000.

Nielsen & Winther, Inc., New York, has been incorporated with a capital stock of \$50,000 by W. M. Hall, L. O. Condit and F. W. Jackson, 353 West Eighty-fifth Street, to manufacture machinery.

The Electric Lock Corporation, New York, has been incorporated with a capital stock of \$200,000 by F. A. Reed, C. A. Jayne and P. M. Freeman, 81 Fulton Street, to manufacture locking devices, etc.

The Standard Electric Mfg. Co., 24 Scott Street, Newark, N. J., has acquired a portion of the building at 126 South Street and will establish a plant.

The Star Foundry Co., Newark, N. J., has been incorporated with a capital stock of \$100,000 by J. J. Palitta, M. D. Paterson and George Palitta.

The Flockhart Foundry Co., Polk and Clover streets, Newark, N. J., has filed plans for a one-story building.

The Howard Moore Co., Newark, N. J., has been incorporated with a capital stock of \$10,000 by Joseph Mehr, Newark; Edward De Wyrall, Ridgefield Park; and H. M. Hanson, Jersey City, to manufacture metal products.

The Overland Rubber Co., Newark, N. J., has acquired the plant of the Millitor Corporation, manufacturer of motorcycles, at Frelinghuysen and Virginia avenues, comprising buildings with 7 acres of land. It will be used by the new owner for the manufacture of automobile tires.

The Public Service Electric Co., Public Service Terminal, Newark, N. J., will make extensions at its electric power plant at Point-no-Point to cost about \$82,000.

The Eastern Gas Appliance Co., 30-32 Clinton Street, Newark, N. J., has filed notice of organization to manufacture gas equipment. John H. Brown, 47 West Forty-second Street, New York, heads the company.

The Artercraft Cabinet Co., Montclair, N. J., has been incorporated with a capital stock of \$150,000 by Archibald C. and G. H. Emery and Howard J. Richards to manufacture cabinets.

The Knoburn Co., 359 Fourteenth Street, Hoboken, N. J., manufacturer of fireproof doors, etc., has filed plans for a two-story works on Fourteenth Street, to replace a section of its plant destroyed by fire early this year.

The Interstate Enameling Co., 621 Communipaw Avenue, Jersey City, N. J., has filed notice of organization to operate a local works. Sidney Cannold and Philip Fishberg, 1382 Prospect Avenue, New York, head the company.

The M. W. Kellogg Co., 117 West Side Avenue, Jersey City, N. J., manufacturer of steel pipe, etc., has had plans prepared for a one-story welding works at its plant site recently secured at Droyer's Point.

The Noma Motor Corporation, 155 Avenue D, New York

recently incorporated with a capital of \$50,000, has increased its capital to \$100,000 paid in. It is manufacturing motor cars and custom built bodies. Wirt W. Walton is president and general manager; Frank Ammann, Jr., is vice-president and secretary; Frank Ammann, Sr., is treasurer. The company does not contemplate adding to its plant or equipment at this time.

The Mohawk Metal Toy Co., 43 Bleecker Street, New York, recently incorporated, is specializing in the manufacture of lithographed sheet-metal toys. It is also prepared to do light metal stampings. M. Wechsler is president.

The L. S. Brach Mfg. Co., is the new corporate style of the L. S. Brach Supply Co., 127 Sussex Avenue, Newark, N. J. The company specializes in the manufacture of electrical accessories for signaling, telegraph, telephone, etc.

The American Machinery Syndicate, 35 West Thirty-ninth Street, New York, recently incorporated, with an active capital of \$550,000, consolidates the businesses carried on by Henry S. Moos, exporter to Spain and Portugal; Herbert M. Hein, formerly export manager of the Kennedy Valve Mfg. Co., which account the new company retains, and L. Ullmann, exporter to Yucatan and Italy. The new organization is extending its business to South America, the Dutch East Indies, Sweden, Holland, Denmark and Norway. Henry S. Moos is president; L. Ullmann, treasurer; and Herbert M. Hein, secretary and general manager.

The Lewis Heater Corporation, Utica, N. Y., has been incorporated with \$150,000 capital stock by A. B. Maynard, J. Rothstein and A. K. McCluney.

With the development of the proposed increase in capacity at its plant, the Nineteen Hundred Washer Co., Binghamton, N. Y., is planning for the installation of an electric oven for enameling service, and later a battery of them, should they prove efficient.

## Philadelphia

PHILADELPHIA, May 26.

A very satisfactory improvement in machine-tool orders is noted by some sellers in this district. Second-hand dealers as well as distributors of new tools have noticed this change for the better. There is keen competition for business and special concessions are frequently made to close orders, although manufacturers' selling prices on new tools are being quite firmly maintained. One form of concession is to take used tools in exchange for new tools at prices higher than the used tools are said to be worth.

Within the next week the Emergency Fleet Corporation expects to sign contracts for the construction of three or four dry docks and ship repair plants on the Atlantic Coast. One or more will probably be built on the Delaware River. Considerable equipment will be required and will be bought by the companies receiving the contracts. The Emergency Fleet Corporation will not own the plants but will furnish a part of the capital.

The American International Shipbuilding Corporation, Philadelphia, which recently asked for quotations on 400 tools—100 each of lathes, drills, shapers and grinders—has referred the matter to the Emergency Fleet Corporation and purchases will not be made until a decision has been reached on a new contract for 100 12,000-ton steel ships, which the Hog Island plant may be awarded by the Fleet Corporation.

The New York Shipbuilding Co., Camden, N. J., has inaugurated operations at its new shipyard at the upper end of Gloucester, on Newton Creek, laying keels for three 13,000-ton d. w. c. combination passenger and cargo vessels, each 335 ft. long, with 72-ft. beam. The plant occupies about 60 acres and was constructed in co-operation with the Emergency Fleet Corporation, representing an investment of about \$10,000,000. The original works as laid out included 24 buildings, but a number of the structures have been eliminated. The largest structure is the plate and angle shop, 200 x 780 ft., which is supplemented by a large machine shop, copper shop, pipe and rigger shop, paint works, power plant, and a number of smaller buildings. The majority of the different buildings have now been completed, but miscellaneous finishing work and machinery installations are still under way.

Frank Cooper and Fred Wittenborn, Trenton, N. J., have established a machine shop on Calhoun Street, near Pennington Avenue, to specialize in work on automobile parts and to do general repairing.

The Bureau of Yards and Docks, Navy Department, Washington, C. W. Parks, chief, will receive bids up to 11 a. m., June 4, for mechanical and miscellaneous operating equipment at the Section Base, Cape May, N. J., oil tanks, pumping plant, etc. The work will include oil and gasoline

pumping and supply system complete with fuel oil pumps driven by steam turbines; Diesel oil and gasoline pumps, electrically driven; sludge pump driven by electric motor; oil heaters and accessories; interior and exterior piping and appurtenances.

The John A. Roebling Sons Co., Trenton, N. J., will make extensions and alterations in its one-story drying oven works at its wire rope manufacturing plant.

The Riberts & Mander Stove Co., Eleventh and Washington streets, Philadelphia, will build a new two-story foundry at Hatboro, Pa., 90 x 120 ft. and 40 x 142 ft.

The Altoona & Logan Valley Railroad Co., Altoona, Pa., subsidiary of the American Railway Co., Witherspoon Building, Philadelphia, is considering the construction of an addition to its electric power plant at Tyrone, to cost about \$500,000.

Yost Brothers, Middletown, Pa., operating a machine shop and automobile service works, will build a one-story addition, 50 x 100 ft., to cost \$10,000.

In connection with the erection of a mill addition, 100 x 400 ft., the Susquehanna Silk Mills, 149 Madison Avenue, New York, will build a one-story reinforced-concrete power plant, 50 x 100 ft., at Milton, Pa.

The Cumberland Valley Railroad, Chambersburg, Pa., has reduced its force of employees, including machinists, blacksmiths and other mechanical operatives, in connection with a reduction on operations at the plant.

A manual training department for machine and mechanical instruction will be installed in the school to be erected by the Board of Education, Boyerstown, Pa., at an estimated cost of \$115,000.

The Montgomery Iron & Steel Co., 1832 North Ninth Street, Philadelphia, manufacturer of steel shapes, etc., will build a one-story addition 160 x 170 ft., to cost \$20,000.

The Wright Roller Bearing Co., Twentieth Street and Indiana Avenue, Philadelphia, has awarded a contract to the John R. Wiggins Co., Otis Building, for the erection of a two-story brick addition, 24 x 60 ft.

Day & Zimmerman, engineers, Sixth and Chestnut streets, Philadelphia, are preparing plans for a one-story foundry at Parkersburg, W. Va.

A one-story boiler plant, 54 x 90 ft., will be erected by the Surpass Leather Co., Philadelphia, at its works at Ninth and Westmoreland streets, at a cost of about \$6,000.

The Excella Tire & Rubber Co., 215 North Fifteenth Street, Philadelphia, has increased its capital stock from \$100,000 to \$1,000,000.

The Alexander Johns Roofing & Mfg. Co., Camden, N. J., has been incorporated with a capital stock of \$20,000 by A. F. and J. V. Abronski, Philadelphia, and A. E. Clausen, Philadelphia, to manufacture roofing, etc.

The Fuller Lehigh Co., Fullerton, Pa., has inaugurated a five-day week schedule at its foundry in place of four-day, recently in force.

The Elliott Blair Steel Co., Mercer, Pa., has arranged for the rebuilding of its one-story plant, 60 x 100 ft., recently destroyed by fire. It will cost about \$30,000.

The Tyrone Motor Co., Tyrone, Pa., will build a one-story machine shop and automobile service works, 50 x 180 ft., to cost \$15,000. F. D. Beyer & Son, Lincoln Avenue, are the architects.

The Universal Machinery Co., Reading, Pa., recently organized, has been incorporated with a capital stock of \$10,000 to manufacture and sell machinery. The incorporators are John B. Krebs, 230 Chestnut street; Charles A. Spaeth, 713 Madison Avenue, and John D. Esterly, 629 Pear Street.

The Stewart Products Service Station, Inc., Philadelphia, capitalized at \$25,000, has been incorporated to manufacture, sell and repair mechanical appliances and accessories. Included among the incorporators are J. P. Murray, 921 South Fifth Street; Frank S. Muzzey, 7326 Bryan Street, Mount Airy, Pa.; F. Stanley Saurman, Churchville, Pa.

## Buffalo

BUFFALO, May 26.

The Buffalo Wagon Works, Buffalo, has been incorporated with a capital stock of \$10,000 and has established a plant at 315 Carrol Street. William D. Welch, manager, and A. Setay and C. Murphy are the incorporators.

The King Refractories Co., Buffalo, has been incorporated with a capital stock of \$50,000 to manufacture high-temperature cements and firebrick. It has leased a building at Niagara and Wayne streets and the New York Central Railroad and will equip it. Ernest J. Eddy, 175 Dorchester Road, is manager. A. B. Templeton and E. J. Eddy, Buffalo,

and S. C. Smith, 404 West 145th Street, New York, are the incorporators.

The Smith Metal Arts Co., Buffalo, has been incorporated with a capital stock of \$100,000 and is establishing a factory at Niagara Street and Massachusetts Avenue for the manufacture of metal specialties and art goods. Frederick C. Smith, C. F. Damm and A. H. Jamieson are the incorporators.

The M. & M. Tractor Co., Buffalo, has been incorporated with a capital stock of \$300,000 to manufacture motor tractors, parts, etc. The incorporators are Christopher M. Baldy, Marine Bank Building; T. R. Wheeler and J. L. Kenefick.

The Electric Twin Water Purification Corporation, Buffalo, has filed articles of incorporation to manufacture water filters. Its capital stock is \$100,000. J. Roche, R. J. Parker and H. W. Smead, 11 Tremont Avenue, are the incorporators.

The H. H. Franklin Automobile Co., Syracuse, is having plans prepared for a die casting plant addition, 70 x 150 ft., two stories, to be erected at an estimated cost of \$85,000.

The Thompson-Field Mfg. Co., Rochester, has been incorporated with a capital stock of \$50,000 to manufacture graphite and carbon articles. The incorporators are G. F. Laube, Rochester; J. P. Thompson, Syracuse, and C. Field, Wellsville, N. Y.

The Art Workshop, 445 Ellicott Street, Buffalo, manufacturer of hardware, etc., will build a new steel and concrete plant on Florida Street, near Jefferson Street, 75 x 137 ft., to cost \$50,000.

The Auto Device Mfg. Co., Buffalo, has been incorporated with a capital stock of \$100,000 by W. Miller, G. A. Lohm and P. S. Wheaton, Kenmore, to manufacture metal specialties.

Michael Hayman & Co., 856 East Ferry Street, Buffalo, metals, will build a one-story foundry, 80 x 100 ft.

The Reliable Stamping Co., 1400 Niagara Street, Buffalo, manufacturer of metal products, has filed plans for an addition to its plant at 9 Lafayette Street, to cost \$10,000.

The Syracuse Auto Supply Corporation, Syracuse, has been incorporated with a capital stock of \$60,000 by H. W. Smith, L. W. Bennett and C. H. Sanford, to manufacture automobile specialties.

The Shull Boltless-Clamp Corporation, Niagara Falls, has been incorporated with an active capital of \$26,250 by L. M. R. C. and J. C. Shull, to manufacture special metal clamps and other mechanical devices.

The Meyer Motor Car Co., 1056 Main Street, Buffalo, is planning the erection of a new machine and service shop to cost \$50,000.

Plans have been filed by the American Radiator Co., 693 Main Street, Buffalo, for a one-story brick and steel addition on Elmwood Avenue to cost about \$20,000.

The Lover Top & Converter Co., Buffalo, has been incorporated with a capital stock of \$75,000 by E. Lover, E. L. Kunz and A. C. Kraft, 465 East Utica Street, to manufacture auto tops and converters, metal accessories, etc.

The plant of the Skahen Steel Co., 523 Leavenworth Avenue, Syracuse, N. Y., included in the merger of the new London Orville Co., Orville, Ohio, will be used for the manufacture of steel box handles, casket hardware, etc. L. E. Ries, formerly treasurer of the local company, will become plant manager at Syracuse.

## Baltimore

BALTIMORE, May 26

The Jones-Boardman Corporation, 910 Fidelity Building, Baltimore, manufacturer of textile machinery, forgings and castings, and builder of automobile and truck bodies, is in the market for various wood-working machines and the following: 50-lb. trip hammer; 25-lb. trip hammer; drill press, 1-in. capacity; sensitive drill press, 1½-in. capacity; double-spindle shaper, ball bearing, 24-in. between spindles.

The Hygienic Bottle Cap Co., Calvert Building, Baltimore, recently organized, is planning to secure a local site at an early date for the erection of its proposed new plant. The initial works will have a capacity of about 500,000 bottle caps per day, with machinery installation estimated to cost in excess of \$20,000. Wesley W. Mason is manager.

O. W. Guy & Co., Colonial Avenue, Norfolk, Va., are planning an addition to their machine shop.

The Independent Trunk & Bag Co., Petersburg, Va., plans to erect a one-story factory building to cost about \$20,000.

Prices on 125-hp. and 200-hp. motors are wanted by the Charlotte Electric Co., Charlotte, N. C.

The T. Murphy Iron Works, Jacksonville, Fla., is seeking prices on bending rolls for ½-in. plate.

Quotations on second-hand McCabe pneumatic flanging machines are wanted by the Crawford-Vaughn Boiler Works, Birmingham, Ala.

The Colonial Garage & Repair Co., Baltimore, has acquired property on Greenmount Avenue and plans for a one-story machine shop and service building, 80 x 200 ft.

The White American Locomotive Sander Co., Richmond, Va., has increased its capital stock from \$75,000 to \$95,000.

The Virginia Shipbuilding Corporation, Alexandria, Va., will rebuild its one-story coppersmith shop, 50 x 50 ft., recently destroyed by fire. It is estimated to cost \$40,000.

## New England

BOSTON, May 26

The machinery dealers of the Scandinavian countries are reviving their connections with American machine-tool builders by the placing of stock orders. Another important development is that considerable numbers of tools have been sold to Belgian customers, through French dealers. It had not been anticipated that Belgium would be able to buy much of anything as soon as this, because of lack of funds, and orders received thus far are in excess of expectations.

New England has not received a very large part of the \$30,000,000 worth of machine-tool orders allotted for the year by the French Government as exceptions under the embargo. Most of the machinery included in the great list is of the heavier types, which France needs at this time. The small number of lighter machines specified is believed to be due in part to a desire to encourage the development of the machine-tool industry of France.

The New England Power Co., Worcester, Mass., whose hydraulic plants furnish many of the industrial centers of New England with hydraulic power, announces that it will spend \$1,000,000 this season in increasing its power and means of distribution. One of the main generating stations of the system is at Vernon, Vt. This station will be enlarged by the erection of a large building and the installation of water wheels and generators to give 15,000 hp. additional, to bring the capacity of the plant to 45,000 hp. Additional substations will be built. Another important work will be connecting the present system, which covers central and western Massachusetts and much of Connecticut and Rhode Island, with the Metropolitan District of Boston by building a line to feed into and from the Edison Co.'s stations.

Landers, Frary & Clark, New Britain, Conn., have received bids for a one-story, 50 x 100 ft., \$25,000 brick building to be used for annealing purposes. Other improvements are planned, including a \$10,000 building and a \$4,000 addition.

A contract has been awarded for the building of a factory, five stories, 63 x 200 ft., for Scott & Williams, manufacturers of knitting machinery, Laconia, N. H.

The North End Carriage & Auto Co., 102 Cleveland Street, Hartford, Conn., is planning for the immediate erection of a new one-story machine and repair shop, 40 x 80 ft., on Windsor Street, to cost about \$5,000.

The Wolcott Mfg. Co., Hartford, Conn., has been incorporated with a capital stock of \$100,000 by Frank E. Wolcott, H. C. Bailey and R. L. Gideon to manufacture electrical tools and other specialties.

The Connecticut Coaster Co., Orange, Conn., has been incorporated with a capital stock of \$35,000 by Samuel A. De Walthoff and Louis Lichtman to manufacture mechanical devices.

The C. F. Probst Mfg. Co., 103 Meadow Street, Waterbury, Conn., manufacturer of machinery, will build a one-story addition to its plant on Watertown Avenue to cost about \$10,000.

The Yale Tire & Rubber Co., New Haven, Conn., recently organized, has purchased property on Dixwell Avenue as a site for a new plant to manufacture automobile tires and other rubber products. J. E. Hubinger is president.

The Presteel Mfg. Co., 183 John Street, Bridgeport, Conn., recently incorporated, has perfected its organization with an active capital stock of \$13,000 to manufacture steel specialties. Alexander Berg is president; Androv H. Carlson, vice-president, and Herman J. Storm, treasurer.

The Dunbar Brothers Co., 76 South Street, Bristol, Conn., manufacturer of steel, bronze and brass springs, etc., will build two three-story additions to its plant, 45 x 115 ft. and 45 x 104 ft.

The Broadway Auto Metal Co., 30 Broadway, Providence, R. I., has been organized to manufacture metal specialties. Harris Verman, 89 Corliss Street, heads the company.

In connection with its proposed expansion, the Carlisle Cord Tire Co., Andover, Mass., manufacturer of automobile tires, has had plans prepared for the construction of a new

one-story, reinforced concrete plant at Stamford, Conn., 150 x 250 ft., to cost \$100,000. It has recently increased its capital stock from \$500,000 to \$1,125,000.

The Davis Foundry Co., Island Street, Lawrence, Mass., is planning for the construction of a one-story addition, 100 x 200 ft.

The American Safety Gas Burner Co., Bridgeport, Conn., has been incorporated with a capital stock of \$25,000 by Samuel Rosenberg, Daniel J. Trivres and Bernard W. Ring to manufacture electric and gas fixtures.

The Waite Furnace Supply Co., 49 Westminster Street, Providence, R. I., has filed notice of organization to manufacture furnace specialties. William A. Waite and Harry L. Martin head the company.

The Graham Mfg. Co., 94 Point Street, Providence, R. I., manufacturer of electrical products, has broken ground for the construction of a new two-story machine shop on Willard Avenue, 42 x 100 ft.

I. L. Norton, Lowell, Mass., operating a machine shop on Lowell Street, is planning for the erection of a two-story addition, 47 x 88 ft.

The C. J. Root Co., Bristol, Conn., manufacturer of counting machines, etc., has awarded a contract to the Ellison Construction Co., Prospect Street, Hartford, for the erection of a four-story addition, 44 x 65 ft.

## Chicago

CHICAGO, May 26.

The trade is more optimistic, not only because the aggregate business for this month promises to be considerably in excess of that for April, but because buyers are beginning to break away from the hand-to-mouth policy of ordering one or two machines at a time. The Continental Motor Mfg. Co., Muskegon, Mich., has ordered eight engine lathes from the Hendey Machine Co., and the Teeter-Hartley Motor Co., Hagerstown, Ind., has placed part of the equipment for which it was recently inquiring. Two inquiries for engine lathes, one for 12 machines and the other for 15, are now being considered by the trade. In the latter instance, the inquiring company proposes to replace cone head belt-driven lathes with all-gear head direct-connected motor-driven machines. Radial drills, horizontal boring and drilling machines, small toolroom milling machines, planers and boring mills are also fairly active. There is one inquiry current for three planers, and the Allis-Chalmers Mfg. Co., Milwaukee, is reported to be in the market for two engine lathes, one planer, and one shaper for shipment to South America. The Chicago & Alton is inquiring for an engine lathe and a heavy duty drilling machine. With this exception there is no activity on the part of the railroads. The Bucyrus Co., South Milwaukee, which has had an extensive list before the trade for over two months, is expected to buy very shortly. A good demand continues for punch presses required by small consumers.

Although the automobile industry is still the most important source of tool business, orders in small lots continue to come from a wide range of manufacturers. Among those who have been active recently are canning machinery, ice machinery and phonograph manufacturers.

One maker of turret lathes in this district has withdrawn the protection it has been extending to buyers against further reductions in prices.

The Spacke Machine & Tool Co., Indianapolis, Ind., has commenced the manufacture of a small automobile to sell for \$295.

The Edison Electric Appliance Co., Inc., Chicago, has asked bids on the structural steel for a 340 x 360-ft. addition to its plant at 5660 West Taylor Street.

The Banner Mfg. Co., Chicago, is having plans prepared for a two-story machine shop, 40 x 75 ft., to be erected at 1865 Clybourne Avenue. The estimated cost is \$15,000.

The Central Machine Shop, 2001 West Thirty-ninth Street, Chicago, has awarded contracts for the construction of a one-story machine shop, 105 x 198 ft., at 1821-37 West Thirty-third Street. The work will involve an expenditure of \$20,000.

The Findeisen & Kropf Mfg. Co., manufacturer of plumb-line supplies and automobile windshields, 2559 West Twenty-first Street, Chicago, has changed its corporate name to the Bencke & Kropf Mfg. Co.

The Flat Metal Mfg. Co., Chicago, has been incorporated with a capital stock of \$10,000. Among the organizers is G. Albin Nilson, 223 West Huron Street.

The Harmony Spring Cushion Co., Chicago, has been organized with a capital stock of \$100,000. David N. C. Antonius, 1307 North Shore Avenue, is one of the incorporators.

The Peerless Pump Co., Chicago, has been incorporated with a capital stock of \$5,000. Among the incorporators is E. W. Lademan, 3906 Christiana Avenue.

The Pacific Flush Tank Co., 4241 Ravenswood Avenue, Chicago, is taking bids on the erection of a one-story plant, 35 x 125 ft., to cost about \$20,000.

The Lazear Auto Lock Wheel Co., Chicago, has been incorporated with a capital stock of \$100,000 to manufacture automobile accessories. Frank S. Lazear, 3731 Sheffield Avenue, is an incorporator.

The Fischer Machine Works, Chicago, has been incorporated with a capital stock of \$50,000. D. I. Jarrett, 111 West Washington Boulevard, is an incorporator.

Derrough & Moore, sheet metal workers, 319 North Neil Street, Champaign, Ill., contemplate the construction of a one-story addition, 36 x 100 ft.

The Rock Island Steel & Machinery Co., Rock Island, Ill., has been incorporated with a capital stock of \$20,000. The organizers are Harry Morris, Maurice and Henry Finkelstein.

The Terminal Railroad Association of St. Louis will construct a boiler shop, 50 x 150 ft., at Brooklyn, Ill.

The Patent Novelty Mfg. Co., Clinton, Iowa, will soon take bids on a one-story addition, 48 x 90 ft., to cost about \$10,000.

The Gibson & Rogers Implement Co., Denison, Iowa, plans to erect a garage and farm implement building to cost about \$45,000.

The Bailor Plow Mfg. Co., Atchison, Kan., will soon commence the construction of an assembling plant and machine shop, 77 x 180 ft. and 100 x 127 ft., respectively, to cost about \$50,000.

The city of Wells, Minn., plans to rebuild its power plant at an estimated cost of \$50,000.

Bids will be received until Aug. 1 by the State Board of Control, St. Paul, Minn., on the construction of a power plant, 40 x 145 ft., at Hastings, Minn. It will cost about \$125,000.

The Grant Wire Wheel Mfg. Co., Chicago, has acquired a three-story and basement building for a term of years at 863-67 West North Avenue for the establishment of a new works.

The Premier Electric Co., 1800 Cuyler Avenue, Chicago, has broken ground for the construction of a new two-story plant at Ravenswood and Grace streets, 66 x 125 ft., to cost about \$50,000.

The P. Phelps Light & Power Co., Rock Island, Ill., has been incorporated in Delaware with a capital stock of \$800,000 by R. W. Phelps, Rock Island, and H. C. Thompson and A. G. Bush, Davenport, Iowa, to construct an electric power plant.

The Illinois Watch Case Co., Elgin, Ill., is planning for the erection of a new power plant.

The Hill Pump Valve Co., 2307 Archer Avenue, Chicago, has completed plans for its new one-story plant at Belmont and Knox avenues, 195 x 265 ft., to cost \$100,000.

## Cleveland

CLEVELAND, May 26.

Machine-tool business in this district continues quite active. While no round lot orders or inquiries developed the past week, a good volume of business in small orders came from scattered sources. The market is steadily broadening, although dealers are still depending on the automobile and allied interests for the bulk of their business. Quite an active demand exists for boring and milling machines from rubber companies and tire mold manufacturers. A local automobile company is purchasing some equipment for its new plant, and the White Co. is buying additional equipment to increase its automobile capacity. The U. S. Metal Goods Co., Cleveland, is inquiring for a number of automatic machines. The Brier Hill Steel Co., Youngstown, is in the market for a steam hammer, shaper, drilling machine and turret lathe.

The Chalmers Pump & Mfg. Co., Lima, Ohio, has been organized to succeed the Chalmers Mfg. Co. It has bought the line formerly manufactured by the Canton-Hughes Pump Co., Wooster, Ohio, and within 60 days will begin making pumps, compressors, condensers, etc. An addition is being built to the machine shop, which will increase the capacity about 100 per cent. A new office building, pattern and storage building are also being erected. C. S. Brown is president; Frank D. Shumate, for many years Chicago manager Worthington Pump & Machinery Corporation, vice-president and general sales manager, and Fred Biscantz, secretary and treasurer. The company has been incorporated with a capital stock of \$300,000, half in common and half in preferred stock.

The Wheeler Radiator & Mfg. Co., Cleveland, has bought the plant formerly occupied by the Federal Nut, Bolt & Machinery Co., Collimer Avenue, East Cleveland, and will make extensions providing 100,000 sq. ft. of floor space. W. H. Ritter is president; D. E. Wheeler, vice-president, and E. F. Halfinger, treasurer. It is stated that promoters of the company were formerly associated with the English & Merrick Co., New Haven, Conn., radiator manufacturer.

The Minerva Foundry & Machine Co., Minerva, Ohio, has been incorporated with a capital stock of \$20,000 and has acquired the plant of the Minerva Motor Car Co., which it will remodel for foundry purposes. All the required foundry equipment has been purchased.

The Leonard Electric Co., 433 Champlain Avenue, Cleveland, will erect a new plant, 86 x 115 ft.

The Warner & Swasey Co., Cleveland, has had plans prepared for a one-story addition, 90 x 176 ft.

The Ohio Electric & Controller Co., 5800 Maurice Avenue, Cleveland, has placed a contract for a two-story plant, 80 x 100 ft.

The Sabin Machine Co., 6536 Carnegie Avenue, Cleveland, has placed a contract for a three-story building, 50 x 80 ft.

The Tuscora Rubber Co., Dover, Ohio, is planning the erection of a new plant. E. M. Blatz, Guardian Building, Cleveland, is one of the promoters. The company has a capital stock of \$2,500,000.

The Triumph Electric & Ice Machine Co., Mansfield, Ohio, has placed a contract for a one-story plant, 60 x 80 ft.

The Kauffman Metal Parts Co., Bellefontaine, Ohio, manufacturer of metal machinery, has increased its capital stock to \$125,000 and will erect a machine shop, 120 x 120 ft. It will also operate a brass, bronze and aluminum foundry. Plans are being prepared by P. C. Dowell, factory manager, and will be ready for bids in about 30 days.

## Detroit

DETROIT, May 26.

The rapid increase in construction work in Detroit and other industrial centers of the State is creating an active demand for machinery. Detroit ranked third in building permits for April, the total being exceeded only by Chicago and New York. The supply of skilled labor barely meets the demand and there is a pronounced shortage of unskilled men.

F. E. Flannigan and associates of Chicago have announced that a \$1,500,000 warehouse will be built along the Pere Marquette and Wabash railroads in Detroit. It will be six stories with 100 ft. frontage on Fort Street and 900 ft. on Ferdinand, of reinforced concrete, and divided into units. The structure is planned to be especially adapted to light manufacturing as well as a distributing center. The Walbridge, Aldinger Co., Detroit, has the contract and states the first unit will be completed by Oct. 1.

The Blakely Mfg. Co. has purchased a factory at Wabash and Stanley avenues, Detroit, where it will manufacture shipping straps for automobiles.

L. A. Young Industries, Inc., Detroit, has purchased the plant of the defunct Patterson Mfg. Co., Holly, Mich., in which it will manufacture wire springs. The Detroit plant is in full operation.

The Michigan Crown Fender Co., Ypsilanti, Mich., is contemplating an addition to its factory.

The Lewis-Geer Mfg. Co., Ypsilanti, is erecting two new buildings to increase its output of coaster wagons.

The Traction Engine Co., Boyne City, Mich., has doubled its capitalization and will manufacture the Heinze four wheel drive tractor.

R. S. Gargatt, formerly with the Republic Motor Truck Co., Alma, Mich., is planning the establishment of a new tractor industry in Owosso, Mich., with a capitalization of \$350,000.

The Standard Parts Co., Flint, Mich., is erecting a new spring factory with a capacity four times the size of the present plant. It will be 110 x 650 ft. and employ 600 men.

The Automobile Street Sweeper Co., Bay City, Mich., has been incorporated with a capital of \$50,000 to manufacture machinery and to do a general shop and foundry business. The incorporators are Carl G. Miller, George A. Doubles and Edward M. Sharpe.

The Sonora Phonograph Sales Co., Inc., has purchased the stock of the Herzog Art Furniture Co. and will erect several additions to the present plant to manufacture phonograph cabinets. The cost of the contemplated buildings approximates \$1,000,000. George E. Brightson is president and Joseph Wolff treasurer.

The Johnson Furniture Co., Grand Rapids, Mich., will erect an addition, 87 x 100 ft.

The Service & Engineering Co., Port Huron, has been incorporated to manufacture machinery and appliances. The incorporators are Elmer G. Brown, Milton W. Draper and Herbert Jewett.

The Interstate Steel Products Co., Detroit, Mich., has been incorporated with a capital stock of \$10,000 to manufacture forgings, stampings, bolts, rivets, etc. The incorporators are Albert D. Harris, Edgar B. Robinson and Harold H. Armstrong.

Construction on the plant of the new Liberty Motor Co., Detroit, has begun. It will occupy 12 acres and be ready for occupation Aug. 1. The initial output will be 80 cars per day. Percy Owen is president of the company.

The Hagen Metal Products Co., Detroit, has increased its capitalization from \$20,000 to \$40,000.

The American Metal Products Corporation, Detroit, has increased its capital stock from \$25,000 to \$50,000.

## St. Louis

ST. LOUIS, May 26.

D. D. Adams, Batesville, Ark., and others will erect a cotton compress requiring about \$35,000 worth of machinery.

May, Killingsworth & Ross, Okolona, Miss., will equip a cotton compress and grist mill, requiring power plant equipment.

The Sallisaw Compress Co., Sallisaw, Okla., with a capital stock of \$75,000, J. Perry Wheeler and others interested, will build a cotton compress.

Newburger & Co., Memphis, Tenn., will establish a cotton compress at Sallisaw, Okla., costing about \$100,000. A 10-acre site has been obtained.

Walsh & Finnell, Hannibal, Mo., care of the Finola Mfg. Co., will equip a machine shop to cost about \$50,000.

The Standard Oil Co. of Indiana will erect a boiler house and pumping plant at Sugar Creek, Mo.

The Morris Packing Co., Chicago, will erect a cold storage plant at Helena, Ark.

The Oklahoma State Hospital, Norman, Okla., D. W. Griffin superintendent, will install ice-making, heating and power plant equipment at a cost of about \$45,000.

The Hinderliter Tool Co., Tulsa, Okla., F. J. Hinderliter and others interested, will establish a plant for the manufacture of special tools, etc. It is capitalized at \$300,000.

The Weber Implement & Automobile Co., St. Louis, will erect a garage and motor rebuilding plant to cost about \$350,000 with equipment.

The Chicago, Rock Island & Pacific Railroad, headquarters at Chicago, H. G. Clark, chief engineer, will equip car shops and a machine shop at Biddle, Ark.

The Yocoka Cooperage Co., Crowder, Miss., is planning for the rebuilding of its stave works recently destroyed by fire with loss estimated at \$100,000.

The Mitchell & Mitchell Mfg. Co., Fort Smith, Ark., recently incorporated with a capital stock of \$50,000 to manufacture bed springs, etc., is planning for the establishment of a local plant. Albert Mitchell, Sr., is president.

The Jackson-May Rubber Co., Little Rock, Ark., has been incorporated with a capital stock of \$50,000 by L. V. Jackson, Russell May and J. D. Simpson, to manufacture rubber specialties.

The Conservation Stove Co., Little Rock, Ark., has increased its capital stock from \$25,000 to \$100,000.

The Industrial Co., Fort Smith, Ark., is planning for the construction of a new plant to manufacture metal drums and similar products. It is said that the proposed works will have an initial capacity of about six carloads per day.

## Cincinnati

CINCINNATI, May 26.

Manufacturers in the metal industries in this district are straining every point to keep their organizations intact and are releasing as few men as possible. A number of machine tool firms, however, find it necessary to stock some standard machines to carry out this plan, but this applies more especially to makers of shaping machines. The number of automobile tire manufacturers that are springing up all over the Central West and elsewhere has developed a large demand for tire molds which is keeping builders of medium sized boring mills very busy. The Miles Tool Works Co., Hamilton, Ohio, is still working on an order from the Navy Department for several large boring and turning machines.

No railroad lists are out, and orders from this source cover only single tools. Detroit automobile manufacturers still prove good customers for different kinds of machine tools.

and are also buying large numbers of portable electric drilling and grinding machines. Business from auto-truck makers is quiet. Tank makers' plants are fairly busy, although these making boilers report that the call is mostly for small and low-pressure boilers.

On May 21 fire destroyed the repair shops of the Pullman Palace Car Co. at Ludlow, Ky., at a loss exceeding \$300,000. It has not yet been announced whether the shops will be rebuilt.

The Liberty Machine Tool Co., Hamilton, Ohio, has increased its capital stock from \$100,000 to \$200,000. A. R. McCann is general manager.

The Master Tire & Rubber Co., Dayton, has been incorporated with \$300,000 capital stock by W. B. Ruston and others, to establish a plant for the manufacture of automobile tires.

It is reported that the Dayton-Wright Airplane Co., Dayton, will soon be awarded a Government contract for 500 special airplanes.

The plant of the Anchor Rubber Co., Columbus, Ohio, was almost completely destroyed by fire May 19. Rebuilding plans have not yet been completed.

It is reported that the Henderson Tire & Rubber Co. will remove its plant from Bucyrus to Columbus, Ohio, where a manufacturing site has been secured. C. O. Henderson is president.

The Southern Foundry & Mfg. Co., Owensboro, Ky., has been incorporated with a capital stock of \$400,000 by E. L. Binns, H. F. Coombs and J. J. Trefz.

The Weighing Machine Mfg. Co., Louisville, Ky., has been incorporated with a capital stock of \$50,000 by Benjamin F. Vogt and associates to manufacture weighing machinery.

William C. Ellis Sons, Memphis, Tenn., desire quotations on a 28 or 30-in. lathe, 14 ft. bed.

## Texas

AUSTIN, May 24.

The Carver Gin Co., Bridgewater, Mass., with a capital stock of \$600,000, has been granted a permit to do business in Texas. It has established headquarters at Dallas and will build cotton gins.

The Mogul Producing & Refining Co., Houston, has been incorporated with a capital stock of \$1,000,000, to operate a refinery. R. G. Dowling is a stockholder.

The Lone Star Refining Co., Wichita Falls, has increased its capital stock from \$200,000 to \$500,000, which will be used to enlarge the capacity of its oil refinery.

The Guiberson Oil Well Specialty Corporation, which succeeds the Guiberson company of Los Angeles, Cal., has purchased a site at Dallas upon which it will build a plant to manufacture oil well tools. The company has a capital stock of \$1,000,000. S. A. Guiberson, Jr., of Los Angeles, Cal., and New York, is a stockholder.

The North Texas Gas Co., Dallas, has been granted a franchise by the City Commission, Waco, to furnish that city with natural gas. The proposed pipe line will also supply Hillsboro, Waxahachie and other towns with fuel.

The Crown Oil & Refining Co., Houston, which is building a refinery at that place at a cost of about \$1,000,000, has increased its capital stock from \$2,000,000 to \$5,000,000. J. C. Stribling, Llano, Tex., is president.

## Pittsburgh

PITTSBURGH, May 26.

Local machinery dealers report inquiries for machinery equipment as active, but say the amount of new business being placed is relatively small. A good many projects under way will involve a large amount of machinery, but some of these are not yet far enough advanced to send out inquiries for the tools needed. The railroads are buying some equipment. Deliveries of machine tools can be made fairly promptly by all the manufacturers.

The Pennsylvania Lines West is going ahead with its new repair shop at Stark, Ohio, which will be a duplicate of the shop it built last year at Logansport, Ind. Recently the Pennsylvania Lines West sent out inquiries for a considerable number of driving-wheel lathes, coach-wheel lathes, cars-wheel borers, axle lathes, some small cranes and miscellaneous tools. A small part of this equipment has already been bought.

The Whitaker-Glessner Co., Wheeling, W. Va., recently purchased lathes from a Pittsburgh house and is still in the market for other equipment.

Williams & Co., Pittsburgh, manufacturers of monel metal, have acquired a larger plant on Pennsylvania Avenue, Northside, Pittsburgh, which it expects to equip shortly.

The site is 100 x 380 ft. on which is a one- and two-story building.

The Gee Electric Co., Wheeling, W. Va., is in the market for machinery, including engine lathes, milling machines, drill presses, shapers, a 100-ton wheel press, and miscellaneous tools.

The Whitehall Motors, Pittsburgh, has been incorporated with a capital stock of \$50,000 by Elmer Whitehall, 5612 Forbes Street, and Earl A. Morton, Pittsburgh, and M. V. Skelly, McKeesport.

The Damascus Bronze Co., 928 South Street, Pittsburgh, is planning for a new three-story and basement works building, 80 x 80 ft., at Leedsdale and Sturges streets.

The Uita Therapeutic Corporation, Pittsburgh, has been incorporated in Delaware with capital of \$200,000 by F. C. Proyer and G. W. Terrence, Pittsburgh, and C. Geitzenger, Erie, Pa., to manufacture therapeutic lamps and similar metal products.

The Wolverine Supply & Mfg. Co., Pittsburgh, is having plans drawn for an addition to its works at Page and Fontella streets.

The Oscillating Washer Co., Pittsburgh, manufacturer of washing machinery, a Delaware corporation, has increased its capital stock from \$75,000 to \$100,000.

The Peoples Natural Gas Co., Pittsburgh, has filed plans for a one-story machine shop on Forbes Street, near Jumonville Street, to cost \$6,000.

The National Metal Moulding Co., Fulton Building, Pittsburgh, has broken ground for a one-story addition to its works at Economy, Pa., 130 x 250 ft.

The Vacuum Sweeper Co., Pittsburgh, has been incorporated in Delaware with capital stock of \$40,000 by Leo T. Bowman and E. W. Carmichael, Pittsburgh, and W. D. Klyes, Wilkinsburg, to manufacture vacuum cleaning machines.

The Consolidated Coal Co., Berryburg, W. Va., is planning the rebuilding of its coal tipples recently destroyed by fire with loss of \$40,000.

The Highglow Electric Sign Co., Warwood, W. Va., manufacturer of electrical signs, has secured a structure formerly used as an aircraft works and will remodel it for its own use.

The Garrett Automobile Co., Clarksburg, W. Va., has awarded a building contract to I. F. Lawman, 310 North Street, for a one and two-story machine works and automobile service building, 100 x 145 ft., to cost \$20,000.

The Airland Motor Co., Greensburg, Pa., capitalized at \$75,000, has been incorporated to manufacture automobiles, aeroplanes, trucks and accessories. The incorporators are Benjamin Ratner, Latrobe; T. A. Gilligan, Latrobe; Emma Baer, Pittsburgh; Samuel Osgood, Pittsburgh; M. Harry Cuff, Pittsburgh.

The Homestead Valve Mfg. Co., Homestead, Pa., has filed notice of an increase in capital of from \$50,000 to \$125,000.

## Indianapolis

INDIANAPOLIS, May 26.

The A. J. Robertson Mfg. Co., Indianapolis, has been incorporated with \$20,000 capital stock to manufacture magnetic motors. The directors are A. J. and J. J. Robertson and J. H. McCormick.

The Public Service Co., Peru, Ind., has been organized by J. S. J. C. and W. D. Whistler, and is establishing a plant for manufacturing a universal joint for automobiles. A concrete building, 80 x 100 ft., will be erected in the rear.

The Gary Vapor-Burner Mfg. Co., Gary, Ind., has been incorporated with \$10,000 capital stock to manufacture burners. The directors are William M. Motto, William L. Pollock and George M. Merritt.

The Majestic Tire & Rubber Co., Indianapolis, has increased its capital stock from \$100,000 to \$250,000.

The Linwood Machine Co., Indianapolis, has been incorporated with \$50,000 capital stock to manufacture vending machines. The directors are Lee R. and J. Harry Finehart and G. Latta.

A. R. Erskine, president Studebaker Corporation, South Bend, Ind., announces that \$5,500,000 will be spent this year on the expansion of the plant, instead of half that amount this year and half next year as originally planned. The capacity of the works will be more than doubled for the exclusive manufacture of automobiles, giving employment to 12,000 additional workmen.

The United Automatic Water Heater Co., Gary, Ind., has been incorporated with \$100,000 capital stock to manufacture heaters. The directors are Christopher C. Weaver, Keith F. Southern and James H. Daniels.

The recently organized Colonial Tire & Rubber Co., Anderson, Ind., announces that the new factory will be started in June with 250 employees.

John F. Godfrey, manufacturer of coal and industrial conveyors, Elkhart, Ind., has purchased the plant formerly occupied by the Elkhart Frog & Crossing Co., which contains 9000 sq. ft. of floor space.

The Simplex Short Turn Trailer Co., Wabash, Ind., has been organized with a capital stock of \$100,000 to manufacture buggies, trailers, and automobiles. The directors include Hoyt A. Summerland, Carl Small and Roy Wertenberger.

The Indiana Rubber Co., manufacturer of automobile and bicycle tires, Jonesboro, Ind., will commence work soon on a three-story addition, 60 x 125 ft.

The Keystone Foundry Co., Plymouth, Ind., a recently organized concern, has awarded contracts for the construction of a foundry, 40 x 100 ft.

The Allmur Mfg. Co., manufacturer of electric stoves, Marion, Ind., has purchased two acres on Thirty-third Street, where it proposes to build a new plant to cost about \$25,000. The capital stock of the company was recently increased from \$25,000 to \$200,000.

## Milwaukee

MILWAUKEE, May 26.

The machine-tool business shows slow but steady improvement and sentiment among manufacturers and dealers is growing better under the additional stimulus of a good stream of inquiries. These, however, are divided into a large number of small requirements, no good sized lots having appeared. Milling machines are still in the best demand, although needs of other classes of tools are growing perceptibly.

An encouraging development in the local industry is the placing of orders for mining machinery costing in excess of \$2,000,000 by Japanese interests represented by the Takata and Mitsui mining companies operating the Fushon mines in Southern Manchuria. K. Yoneka, general manager of the mines, and a party of engineers, spent most of the past week in Milwaukee to arrange for deliveries. It was stated that further orders would be placed later in the year by the same interests.

The Wisconsin Parts Co., Oshkosh, Wis., has been incorporated with a capital stock of \$500,000 to take over the business and assets of the E. B. Hayes Machinery Corporation, manufacturer of automotive parts and specializing in worm-drive rear axles for motor trucks. The Hays company has been planning to double the size of its plant to carry out this project the re-incorporation has been effected under the direction of W. F. Rockwell, formerly vice-president in charge of engineering and production of the Torbenson Axle Co., Cleveland, who on May 1 assumed the duties of president and general manager of the new company.

The Hamilton Mfg. Co., Two Rivers, Wis., manufacturer of steel and wood furniture and fixtures, will make additions to its metal-working department and warehouse facilities to cost between \$100,000 and \$125,000. A brick and steel addition, 100 x 150 ft., three stories, will be erected first. The work is in charge of Lockwood, Green & Co., consulting engineers, Chicago.

The Router Mfg. Co., Oshkosh, Wis., has been organized with a capital stock of \$100,000 to manufacture metal and wood working tools, hardware specialties and metal goods. The incorporators are William P. Casey, E. G. Race and James C. Casey.

The Standard Foundry Co., Racine, Wis., is building a \$25,000 addition of brick and steel, 50 x 100 ft., designed by Edmund B. Funston & Co., architects. It will be ready for occupancy about June 30.

The F. Eggers Veneer Seating Co., Two Rivers, Wis., has engaged Lockwood, Greene & Co., consulting engineers, Chicago, to design and supervise the construction of a three-story brick and steel factory addition, 60 x 125 ft., and a power plant extension, 20 x 40 ft., which will represent an investment of about \$100,000.

The Honold Electric Co., 819 Pennsylvania Avenue, Sheboygan, Wis., will build a one-story addition, 50 x 80 ft., for the repair and maintenance of storage batteries and automotive electrical devices.

The International Toy Co., Eau Claire, Wis., awarded the general contract for the erection of the first unit of its new metal and wood toy and novelty plant to E. P. Degenhart, local. It will be one story, crescent shaped, 60 x 200 ft., of brick and cost about \$50,000. L. D. Pangborn is general manager.

E. N. Running and Charles Hack, Superior, Wis., have organized the Superior Sheet Metal Works and are establishing a factory at 628-630 Ogden Avenue for general sheet metal work, with roofing a specialty.

William Loeffler, 826 St. Clair Avenue, Sheboygan, Wis., will build a new machine shop, 40 x 80 ft., one story, at George Avenue and South Seventeenth Street. He manufactures special machinery and conducts a commercial machine-shop business.

C. H. Lohr, Hartford, Wis., proprietor of the Lohr-Ford Garage, will erect a new building, 60 x 110 ft., for machine and repair work.

The Aluminum Goods Mfg. Co., Manitowoc, Wis., has taken over the foundry and machine shop of the Aluminum Castings Co., Cleveland, which on May 1 discontinued its Manitowoc works and moved the equipment to the Detroit and Cleveland plants. The buildings are being razed and the site will be used for a \$500,000 addition, 160 x 280 ft., five stories. This will increase the floor space of the Manitowoc works 121 per cent. The improvement is distinct from the two factory additions to be erected by the company at Two Rivers, Wis., costing approximately \$750,000. The general contracts have been awarded to Walter W. Oefflein, Inc., 86 Michigan Street, Milwaukee. George Vits, president and general manager.

The Northwestern Casket Co., St. Paul, Minn., will locate its factory at Fox Lake, Wis., and will begin work June 2 on the erection of a one-story brick and concrete plant, 80 x 230 ft., costing about \$50,000.

The S. Miller Fruit Co., Rhinelander, Wis., has plans for a three-story cold storage warehouse, 44 x 116 ft., with a new refrigerating plant, the whole to cost about \$75,000. W. W. Miller is general manager.

## California

LOS ANGELES, May 20.

The California Waste Co., Calexico, Cal., has filed plans for the construction of a machine shop addition.

The Knapp Tractor & Machinery Co., Los Angeles, has been incorporated with a capital stock of \$20,000 by William B. Knapp, San Francisco, and Edward S. Hough, to manufacture tractor parts, etc.

The Southwestern Dry Dock Co., Los Angeles, has been incorporated with a capital stock of \$1,000,000 by Marco H. Hellman, W. F. Howard, Irving H. Hellman and Daniel K. Drake, to construct a dry dock and shipyard at Los Angeles Harbor, San Pedro.

The Weldon Sash & Door Mill, San Diego, has secured permission to build a new planing mill on the tidelands, foot of F Street. The structure is estimated to cost about \$10,000, and the machinery and equipment \$15,000.

The Celite Products Co., Van Nuys Building, Los Angeles, manufacturer of insulation products, has increased its capital stock from \$1,000,000 to \$1,400,000. It maintains offices at 11 Broadway, New York.

The City Council, Los Angeles, has called a special election on June 3, to vote bonds for \$13,500,000 for the municipal electric power system. About \$2,500,000 will be expended for the erection of electric generating plants in the San Francisquito Canyon, known as Plant No. 2, and hydroelectric development in the Owens River gorge, with new power plant in the Franklin canyon. The remainder will be used for the distributing system. E. F. Scattergood is chief engineer of the Power Bureau.

The Western Torpedo Co., Los Angeles, has been organized to manufacture oil well explosives. R. H. Percival, 232 South Alexandria Avenue, heads the company.

The Auto Sheet Metal Works, Los Angeles, has been incorporated with a capital stock of \$50,000 by E. D. Morgan, R. M. Graham, W. A. Hoag and John Helsley to manufacture metal specialties.

The Pacific Gas & Electric Co., San Francisco, is planning for the early resumption of work in connection with the establishment of a hydroelectric power plant in the Big Bend of the Pit River, with extensive power development in this district. The project is estimated to cost in excess of \$12,000,000.

The Tucker Pump Co., Los Angeles, has been incorporated with a capital stock of \$200,000 by Ralph H. Tucker, Maricopa; L. R. Taylor, Taft, and Edgar S. Cameron, Los Angeles, to manufacture pumping machinery.

The American Auto Body Works, 1141 South Los Angeles Street, Los Angeles, has been organized to manufacture

automobile bodies. W. J. Warren and J. E. Voce head the company.

G. Crofoot, Porterville, Cal., is planning for the rebuilding of his machine shop, destroyed by fire on May 1, with a loss of about \$8,000.

The Planet Rubber Co., Los Angeles, has been incorporated with a capital stock of \$250,000 by Joseph S. Love, W. A. Jackson and George W. Grant, to manufacture rubber specialties.

## The Pacific Northwest

SEATTLE, May 26.

The persistent report that with the completion of the contracts now held by Northwest steel shipbuilders work of building ships will come to a standstill, is having a serious effect on all lines of industry. One of the interesting probabilities is that the Foundation Co. may be able to bring back to its Tacoma and Portland yards the \$200,000,000 order for 174 steel ships which it holds with the French Government. The company planned to convert its Tacoma and Portland wooden yards into steel plants, but this was abandoned when the Government put the ban on foreign contracts. It is reported all work has been stopped at its yards at Cotte, France, and that steps will be taken to resume activities on the Coast.

Lumbermen report that the mills are overwhelmed with orders. The market is strengthening, and marked advances have been recently announced.

O. K. Palmer, Clehalis, Wash., has taken over the old Clehalis Fir Door factory and will convert the plant into a "ready cut" house factory. Some new equipment will be installed.

The Portland Manufacturing Co., Portland, will erect a building to manufacture wooden novelties.

The Renner Mfg. Co., Seattle, manufacturer of auto heaters and radiators, will build a two-story addition. New equipment, electrically operated, will be installed.

Lieut. Ben Ostlund, Marshfield, Ore., representing Eastern interests, will construct a veneer plant on Coos Bay, to cost about \$35,000. Plans have been completed, and provide for a structure 60 x 200 ft.

A fire in the plant of the Grays Harbor Motorship Co., Aberdeen, Wash., recently destroyed one large hull under construction, and the pipe, sheet metal and tin shops. The loss is placed at \$500,000.

The B. C. Hardwood Floor Co., Vancouver, B. C., will erect a new factory and storage building, two stories, 27 x 120 ft. It will be equipped with new machinery.

The Vancouver Shipyard, Ltd., Vancouver, B. C., plans extensive improvements, including the erection of a frame solution and installation of some new equipment.

The Astoria Marine Iron Works, Astoria, Ore., recently received an order for 60 propeller wheels, weighing from two to three tons each, for foreign interests.

The Robertson & Hackett Sawmill Co., Vancouver, B. C., plans to raze its present plant and replace it with an electrically-driven sawmill, costing \$40,000.

The plant of the Menefee Lumber Co., Portland, was recently damaged by fire to the extent of \$40,000.

## Canada

TORONTO, May 26.

The demand for machinery and machine tools is picking up fast and local dealers state that on a good many lines delivery dates are much poorer than usual. Several weeks, and in some cases months, are required before the machine can be delivered. This is attributed largely to the buying campaigns that have been carried on by several automobile concerns which were ready as soon as the war restrictions were taken off to go ahead with an extensive line of manufacture. Dealers are of the opinion that orders for machine tools from automobile manufacturers in the Dominion will be greatly increased in the next few months. Tools and equipment for the Canadian railroads is another source of demand and many millions of dollars are being spent to replace machinery, rolling stock, etc.

A number of plants in the Montreal district are increasing their output and also adding new lines. The Maple Leaf Mfg. Co., Montreal, is erecting a large plant which will require equipment. I. Matheson & Co., New Glasgow, N. S., is in the market for second-hand machinery. Canadian dealers are showing considerable interest in the proposal of the Lake Huron Steel Corporation to erect a mammoth

plant at Goderich, Ont., which will be started in about two months. It is expected that its machinery lists will be out before many weeks.

Canadian shipbuilders have embarked on an extensive program and an active demand for marine boilers, engines, etc., is looked for. The market for stationary boilers is, on the other hand, not active just now.

The A. R. Williams Machinery & Supply Co., Ltd., Toronto, has taken possession of its new building at 320 St. James Street, Montreal, with J. N. Robinson in charge. It will handle lines similar to those carried by the Toronto company, including engines, boilers, waterwheels, electric motors, machinery and equipment for boiler rooms, machine shops, shipyards, pulp and paper mills; also mining, road-making machinery, gas engines and a number of other general lines. T. A. Hollinrake, president of the Toronto company, is also president of the Montreal concern.

The Spruce Falls Pulp & Paper, Ltd., Bradford, Pa., S. A. Mundy, president, is having plans prepared for the erection of pulp and paper mills at Kapuskasing, Ont.

Plans are being prepared for two factories to cost \$75,000 for the Dupre Iron Works Co., Ltd., Montreal. The architect, P. L. W. Dupre, 15 St. Lawrence Boulevard, Montreal, is receiving prices on equipment for the manufacture of architectural iron.

Viau & Delphex, 32 Leff Street, Ottawa, Ont., will build a boiler house to cost \$9,000.

Plans are being prepared by Hynes, Feldman & Watson, McKinnon Building, Toronto, for an addition for the K. & S. Tire & Rubber Co., Weston, Ont.

The city of Parry Sound, Ont., is arranging for the erection of an electric light plant to cost \$165,000. C. H. and P. H. Mitchell, Traders' Bank Building, Toronto, are the engineers.

The Peerless Films, Ltd., Calgary, Alta., has been incorporated with a capital stock of \$24,000 by Abe Barron, Samuel J. Helman, Harry Kaufman, Calgary; William Sugarman, Edmonton, Alta., and others, to manufacture motion picture machines, etc.

The Oil Engine Works of Canada, Ltd., Montreal, has been incorporated with a capital stock of \$30,000 by Frank Callaghan, Francois X. Biron, Avila Gamache, and others, to manufacture machinery, engines, tools, etc.

The Globe Automatic Sprinkler Co., Ltd., Toronto, has been incorporated with a capital stock of \$45,000 by Walter R. L. Shanks, Francis G. Bush, George R. Drennan, and others, all of Montreal, to manufacture automatic sprinklers, fire extinguishers, valves, fittings, machinery, etc.

The H. A. Wood Mfg. Co., Ltd., Toronto, has been incorporated with a capital stock of \$1,000,000 by Melvin G. Hunt, 28 Douglas Drive; Clarence H. McArthur, 102 Spadina Avenue; David McLaren, and others, to manufacture valves, automobile accessories, machinery, engines, etc.

The Ajax Wire Wheel Corporation of America, created under the laws of New York State, has been granted a license to carry on business in Ontario with a capital stock of \$40,000 to manufacture wire wheels, vehicles and parts, etc. W. R. P. Parker, 1126 Traders' Bank Building, is the company's representative.

The General Motors Corporation of Canada, Ltd., Walkerville, Ont., has been incorporated with a capital stock of \$10,000,000. R. S. McLaughlin, president of the McLaughlin Motor Co., is president of the new concern and will have charge of the Canadian business. It will start work at once on the erection of a plant at Walkerville, to cost \$6,000,000.

Plans for the erection of a factory building for the National Paper Goods Co., Ltd., Hamilton, Ont., are being prepared. It will be 75 x 285 ft., two stories and basement, on the site adjoining the property recently acquired by the Hoover Suction Sweeper Co.

I. Matheson & Co., Ltd., New Glasgow, N. S., is in the market for a used plate punch and shear, 36-in. gap, capacity 7½-in. hole in ¾-in. plate; also steam-driven, compound air compressor with 12 x 12-in. cylinder.

## Government Purchases

WASHINGTON, May 26.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, for supplies for the naval service as follows: Schedule 3978, for 2800-lb. and 1200-lb. steam drop hammers for Brooklyn; schedule 3992, for 1 350-ton hydraulic joggling press, f.a.s. New York or San Francisco; schedule 3982, 1 belt or gear-driven triplex water pump for Anacostia, D. C.

The Alaskan Engineering Commission, Seattle, Wash., will receive sealed proposals under circular 361, until 11 A. M., June 9, for furnishing pipe-threading machines.

# Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

## Iron and Soft Steel Bars and Shapes

	Per lb.
<b>Bars:</b>	
Refined iron, base price .....	3.37c
Burden's H. B. & S. bar iron, base price.....	6.30c
Burden's best bar iron, base price.....	6.50c
Swedish bars, base price.....	20.00c
<b>Soft Steel:</b>	
¾ to 1½ in., round and square.....	3.37c
1 to 6 in. x ¾ to 1 in.....	3.37c
1 to 6 in. x ¼ and 5/16.....	3.47c
<b>Rods—¾ and 1 1/16.....</b>	<b>3.42c</b>
<b>Bands—1½ to 6 x 3 16 to No. 8.....</b>	<b>4.07c</b>
<b>Shapes:</b>	
Beams and channels—3 to 15 in.....	3.47c
<b>Angles:</b>	
3 in. x ¾ in. and larger.....	3.47c
3 in. x 3/16 and ½ in.....	3.72c
1½ to 2½ in. x ¼ in.....	3.52c
1½ x 2¼ in. x 3/16 in. and thicker.....	3.47c
1 to 1¼ in. x 3 16 in.....	3.52c
1 to 1¼ in. x ½ in.....	3.57c
¾ x ¾ x ½ in.....	3.62c
¾ x ½ in.....	3.67c
¾ x ¼ in.....	4.4c
½ x 3/32 in.....	5.1c
<b>Tees:</b>	
1 x ½ in.....	3.87c
1¼ in. x 1¼ x 3/16 in.....	3.77c
1½ to 2½ x ¼ in.....	3.57c
1½ to 2½ x 3/16 in.....	3.57c
3 in. and larger.....	3.52c

## Merchant Steel

	Per lb.
Tire, 1½ x ½ in. and larger.....	3.37c
Toe calk, ½ x ¾ in. and larger.....	4.25c
Open-hearth spring steel.....	6.00c
Standard cast steel, base price.....	14.00c
Extra cast steel.....	18.00 to 20.00c
Special cast steel.....	23.00 to 25.00c

## Tank Plates—Steel

	Per lb.
¼ in. and heavier.....	3.67c

## Sheets

### Blue Annealed

	Per lb.
No. 8 and 3/16 in.....	4.52c
No. 10 .....	4.57c
No. 12 .....	4.62c
No. 14 .....	4.67c
No. 16 .....	4.77c

### Box Annealed—Black

	Soft Steel C. R. One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20 .....	5.17c	
Nos. 22 and 24.....	5.22c	6.55c
No. 26 .....	5.27c	6.60c
No. 28 .....	5.37c	6.75c
No. 30 .....	5.57c	
No. 28, 36 in. wide, 10c higher.		
Wood's Keystone Hammered, 18-24 gage, 9¼c; 26-28 gage, 10¼c.		

### Galvanized

	Per lb.
No. 14.....	5.60c
No. 16.....	5.75c
Nos. 18 and 20.....	5.90c
Nos. 22 and 24.....	6.05c
No. 26 .....	6.20c
No. 27 .....	6.35c
No. 28 .....	6.50c
No. 30 .....	7.00c
No. 28, 36 in. wide, 20c. higher.	

### Corrugated Roofing, Galvanized

2½ in. corrugations, 10c. per 100 lb. over flat sheets.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

## Steel Wire

	BASE PRICE* ON NO. 9 GAGE AND COARSER	Per lb.
Bright basic .....		5.25c
Annealed soft .....		5.25c
Galvanized annealed .....		6.00c
Coppered basic .....		6.00c
Tinned soft bessemer .....		7.25c

\*Regular extras for lighter gages.

## Brass Sheet, Rod, Tube and Wire

	BASE PRICE
High Brass Sheet .....	20¼c to 22¼c
High Brass Wire.....	20¼c to 22¼c
Brass Rod .....	19c to 20¼c
Brass Tube .....	31¼c to 35¼c

## Copper Sheets

Sheet copper, hot rolled, 16 oz., 23½c. to 26c. per lb. base.  
Cold rolled, 14 oz. and heavier, 1c. per lb. advance over hot rolled.

## Tin Plates

	Bright Tin	Grade "A"	Grade "A"	Coke—14x20	Primes	Wasters
	Grade "AAA" 14x20	Grade "A" 14x20				
	Charcoal	Charcoal				
IC ..	\$11.30	\$10.05		80 lb. ...	\$8.30	\$8.05
IX ..	13.50	12.00		90 lb. ...	8.40	8.15
IXX ..	15.25	13.75		100 lb. ...	8.55	8.30
IXXX ..	17.00	15.50		IC ...	8.80	8.55
IXXXX ..	18.75	17.25		IX ...	10.00	9.75
				IXX ...	10.95	10.70
				IXXX ...	11.90	11.65
				IXXXX ...	12.85	12.60

## Terne Plates

	8-Lb. Coating 14x20
100 lb. ....	\$8.50
IC .....	8.65
IX .....	9.65
Fire door stock .....	11.50

## Tin

Straits pig .....	74c to 75c
Bar .....	85c to 90c
American pig, 99 per cent.....	70c to 72c

## Copper

Lake Ingot .....	18c to 19c
Electrolytic .....	17½c to 18½c
Casting .....	17c to 18c

## Spelter and Sheet Zinc

Western spelter .....	8½c to 9c
Sheet zinc, No. 9 base, casks.....	12c; open 13c

## Lead and Solder\*

American pig lead.....	6c to 6¼c
Bar lead .....	7½c to 8¼c
Solder ½ & ½ guaranteed.....	45c
No. 1 solder .....	40c
Refined solder.....	34c

\*Prices of solder indicated by private brand vary according to composition.

## Babbitt Metal

Best grade, per lb.....	90c
Commercial grade, per lb.....	50c

## Antimony

Asiatic .....	8¼c
---------------	-----

## Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. ....	37c to 39c
--	------------

## Old Metals

The market is stronger. Dealers' buying prices are nominally as follows:

	Cents Per lb.
Copper, heavy and crucible .....	14.25
Copper, heavy and wire .....	13.25
Copper, light and bottoms .....	11.25
Brass, heavy .....	8.75
Brass, light .....	6.50
Heavy machine composition .....	13.50
No. 1 yellow rod brass turnings .....	7.75
No. 1 red brass or composition turnings .....	11.00
Lead, heavy .....	4.25
Lead, tea .....	3.50
Zinc .....	4.25

